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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

In administering the Federal meat-inspection law, employes of the Federal Bureau of Animal Industry inspected more than 74,000,000 animals and the resulting meat and meat food products during the fiscal year ending June 30, 1931.

Mineral feeds, vitamine carriers, such as cod liver oil, bountiful supplies of protein in the ration, and other methods of fortifying the ration of dairy cows all have failed, utterly, in aiding cows to resist Bangs disease, in a carefully planned experiment that has been underway four years at the Wisconsin Station.

County agents are not trained veterinarians. When they enter the diagnostic and treatment field of animal diseases, the farmers are not getting the best service. Yet such service by publicly paid employes may cut into the practice of the professional veterinarian and make it impossible for him to live, except in a few of the larger cities or more densely populated counties. The veterinary profession, I understand, is declining, with decreasing numbers of students preparing in this field to which condition the veterinary work done by some extension workers may be a contributing factor.—C. W. Warburton, Director of Extension Work, U. S. Department of Agriculture.

During the past year more than 10,000 animals in 762 herds in Missouri have been blood tested for Bang's disease or contagious abortion.

Holding an old customer is more important than getting three trial orders from new ones. Losing an old customer is fairly good proof that you will not satisfy new ones.

A prosperous and stable agriculture will never come as long as individual farmers are constantly at the mercy of preventable but as yet uncontrolled pests and pestilence. —Wisc. Bul. No. 420.

A study of weeds on 420 Indiana farms has shown that white snakeroot, cocklebur sprouts, waterhemlock, and wild cherry are the most important weed poisons to livestock in that state. Some loss is also caused by sweet clover hay, black locust bark, staggerweeds, and buckeye sprouts.

Eczema in an Hungarian was found to be due to chemic substances from money. This Hungarian was employed by the Budapest Street Car Company and counted money—silver, nickel and copper—all day long. Most veterinarians are relatively free from eczema of this origin—they usually handle paper money.

An animal said to have been a cross between an elk and a moose was killed in the Deerlodge National Forest in Bear Gulch. This is the first known cross between a deer and an elk (if it was).—*Science* No. 1911.

"Nervous" or "fainting" goats is the name of a type of goats that appear to lose consciousness when suddenly frightened or startled. This type of goats is found in Tennessee and more recently has been observed in Dickens County, Texas. During the fright fits they are rigid. The fits are of brief duration and the animal regains control of its front legs first, the hind legs dragging appreciably for a brief time. Other than this nervous peculiarity, the goats are apparently normal. The cause of the condition is unknown.—*Journal of Heredity,* Vol. 21, No. 16.

In an investigation made at the Wisconsin Station 340 S. C. White Leghorns and Barred Plymouth Rock hens were used to determine the economic importance of pullorum disease. Of these hens 135 were reactors and 205 were non-reactors to the agglutination test for bacillary white diarrhea. The reacting Barred Rocks laid an average of 206 eggs; the non-reactors an average of 198 eggs. The reacting White Leghorns laid an average of 207 eggs; the non-reactors an average of 209 eggs. Seventy-three per cent of the fertile eggs laid by the reacting Barred Rocks hatched; 66% of those laid by the non-reactors hatched. Of the White Leghorns 63% of the fertile eggs of reactors hatched and 69% of those of non-reactors hatched. The mortality of the chicks (up to four months of age) was 7.4% of those hatched from eggs from reacting hens and 7.7% from eggs from non-reactings hens. The conclusion drawn from the experiment is: "It seems certain that the presence of bacillary white diarrhea organisms of the type studied in this investigation, as indicated by the agglutination test does not reduce egg production, impair hatchability or lessen the viability of chicks hatched from eggs laid by hens which react to this test."

A species of fleas, *Xenopsylla cheopis,* obtained from wild rats, has been demonstrated to be capable of transmitting endemic typhus, or Brill's disease, a mild type of typhus which occurs to a considerable extent in Southeastern United States. It is regarded as the probable agency through which natural infection occurs in man, in this area.

"Duck-legged" cattle is a name applied to a condition that has been observed on some Texas ranches. It has been attributed to continued outcrossing to purebred Hereford bulls, accompanied by selection of the short-legged females. The "duck-legged" cattle cannot be distinguished from purebred Herefords, except for their short legs.—*Journal of Heredity,* Vol. 21, No. 2.

Calves cannot be grown from birth to maturity on milk or grain alone. Calves fed concentrates alone die in convulsions. Calves fed hay do not show these symptoms. Cows fed solely on a concentrate ration give birth to dead or blind calves. Hay apparently carries a factor or factors necessary for the growth and health of calves. Cod liver oil possesses this same factor or factors, according to an experiment conducted at the Michigan Station.

STUNTED FORAGE PLANTS MAY POISON LIVESTOCK

Some plants on which livestock are pastured may develop poisonous properties as a result of drought, frost, wilting, or severe trampling. According to the U. S. Department of Agriculture, which has investigated reports of livestock poisoning, such plants as Sudan grass, velvet grass, sorghum, and Johnson grass have been found to develop prussic acid when their growth is retarded by abnormal conditions such as those mentioned. Under normal conditions prussic acid is not found in any of these plants.

A list of the more important plants of the United States which develop prussic acid when their growth is retarded includes: chokecherry, black cherry, sorghum, Johnson grass, arrowgrass, sudan grass, and velvet grass.

The Aschheim-Zondek test for pregnancy depends upon the fact that within a few days after conception the pituitary gland empties an excessive amount of its hormone into the blood. The excess pituitary hormone is eliminated by the kidneys; the urine injected into a non-pregnant, female, experimental animal produces detectable changes in the ovary. The test is named for its discoverers —two German doctors.

Fitweed is the name of a poisonous plant, *Capnoides caseana,* that grows in the Northern Sierra Nevada Mountains. This plant is poisonous for both sheep and cattle and may have been responsible for rather extensive losses in sections where the plant abounds. The weed was so named because the affected animals have convulsions. The active poisonous principal is an alkaloid. No treatment has been devised. However, it would probably not be difficult to eradicate the plant.—*Nev. Bulletin* 121.

The keeping of green forage for winter feed is not new. Caesar, upon invading Gaul, put green grasses in pits as a source of feed for his cattle and horses. The ancient Egyptians put their surplus green forage in a pit to keep it as a safeguard against famine. The first printed book on silage was published in Europe about 1860. The first definitely known silo in the United States was erected in Illinois in 1873. This silo was square and was used continuously until 1919.—*Poland China Journal,* Vol. 18, No. 3.

At the Iowa Experiment Station, it was found that dairy cows that were provided with drinking cups in their stalls consumed 18.7 per cent more water and produced 6.14 per cent more milk and 12.12 per cent more fat than cows watered at outside tanks. It was further found that 36.1 per cent of the water consumed by the cows with water constantly before them in the drinking cups was between the hours of 6 p. m. and 5 a. m. It is economical to provide a constant supply of water for dairy cows.—*Exp. Sta. Rec.* 655-2.

Pineapple bran made from the outer shell and sometimes the core of pineapples is a valuable feed for livestock because of the high sugar content. This by-product feed is of special value for the fattening of swine and cattle. Over 10,000 tons of pineapple bran was produced in Hawaii in 1930.

When a three-year-old bullock was slaughtered at Smithfield, seven pounds of rusty nails and screws, a silver brooch, the remains of a rubber Wellington boot, part of a bowler hat, a shoe buckle, and several pieces of copper wire were found in its stomach. The animal was in perfect health before being killed.—*Veterinary Record.*

The maggot treatment of bone injuries, called to the attention of army surgeons by Doctor Crile of Cleveland during the World War, is not new. The possible beneficial work of these larvae was noted by Pare, a French surgeon in the 16th Century and the value of maggots in removing necrotic and putrefying tissue in wounds was recognized by Larrey, a French surgeon, shortly after the Napoleonic campaign in Egypt.

AVIAN TUBERCULOSIS

Tuberculosis is widely prevalent in the poultry flocks of the North-Central and Middle-West states, causing large losses by deaths, reducing their productivity and infecting pigs associated with them.

The tuberculin test and post-mortem inspection show a relatively low percentage of tuberculous young birds, but a high percentage of old birds infected with this disease.

A poultry flock may be infected with tuberculosis and the live birds show no physical symptoms of the disease, because only those specimens which have reached an advanced stage show external evidences, such as thin breast, pale comb, lameness, etc.

Hens lay one-third more eggs the first year as pullets than during the second year of production. If the profitable practice of disposing of the flock at the end of the first laying season is adopted tuberculosis will in time disappear from the flock.

Milk Fever

By E. T. BAKER, Moscow, Idaho

AFTER having treated over several thousand cases of milk fever the past twenty years, we have probably had sixty fatalities. Every year we have two or three cases that do not respond to treatment, and our endeavors are followed by a quiet country funeral. Most of these fatal cases seem to recover from the parturient paresis itself, only to fall a victim to some complication.

Impaction of the rumen and paralysis of the whole intestinal tract; bloat; eversion of the uterus, bladder or vagina; mastitis; pneumonia; traumatic pericarditis; edema of the glottis; partial or complete paraplegia due to bruising of the pelvic outlet or to a thrombosis; septicemia; eclampsia; fractures pelvis or vertebrae; uterine or abdominal hemorrhage; tetanus; malignant edema and hemorrhagic septicemia are a few of the "trimmings" we have seen accompanying milk fever. In fact, due to the low resistance of the animal at this particular time, almost anything but orchitis may be present.

With these complications in mind, we treat milk fever more as a pathological entity than as one disease. We find cattle owners soon learn to call us rather than risk the old tire pump themselves. They soon find out the patient may die getting well, and it pays to call in veterinary assistance at the beginning.

While we have never had much trouble with infection following inflation, we have welcomed the new lines of treatment as a distinct advance in practical therapeutics. We have only used inflation in three out of the last forty-odd cases, but we discarded it very gradually and cautiously. When a good client thinks the udder should be "blowed up," we do it to please him and to protect ourself. Then, if anything out of the ordinary does happen, the owner feels that all possible measures have been taken. In other words, it is poor policy to argue with a client.

We have noticed the larger or beef breeds more prone to eclampsia, while the smaller breeds seem subject to a profound coma. Holsteins appear to have more digestive complications, such as paralysis of the rumen, due, no doubt, to their hearty appetites. We have also noticed that a great many cases occur when the barometer is falling, and we can often predict a storm several days in advance. The question of a balanced ration seems to have little to do with its occurrence. Evidently some glandular deficiency interferes with the normal absorption of calcium or other necessary elements. Briefly, what we do not understand about milk fever would fill a very large book.

In winter we have found a very obstinate impaction of the stomachs and bowels with milk fever, and we think this condition should be treated simultaneously.

With the animal on her right side, we introduce our trocar and inject directly into the rumen our bovine purgative mixture, consisting of sodium hyposulphite, sodium chloride, fluid extract aromatic cascara, fluid extract nux vomica, saccharine, corn syrup, and two tablets of rumen accelerator (15 grains each). If there is any gas present, we add several ounces of aromatic spirits ammonia. We also administer a quarter grain eserin, and a good, warm soapsuds enema.

In the fatal cases of milk fever we have had the opportunity to perform an autopsy on, we have found several conditions pretty common. Of these, impaction of the third stomach seems quite frequent. In many cases, this organ was as black inside among the leaves as carbon paper. In other cases, a large clot of blood has been found in the region of the uterus and kidneys. One case of a rather delicate Jersey cow delivering large twins, all the tissues seemed to be of a pale appearance.

If the owner could only recognize these prodromal symptoms, and call assistance

before the animal went down for her last count, we think some of these fatal cases might be saved, if treated in time.

Experienced practitioners know too well the dangers surrounding the recently parturient animal, for almost anything can happen when least expected.

Several hours after treatment one can make a pretty good prognosis (to himself, only), for there are certain undefinable symptoms and actions on the part of the patient that gives us a "hunch" she is going "haywire," as the hired man would express it. Unfortunately, for the practitioner, some of these fatal cases are not the most apparently serious ones. We have even had cases that were standing up when we first treated them, but later they went down and stayed there. We therefore make no rosy political promises until the cow is up and stowing away about two gallons of ground oats *per diem* as we scientists would express it.

For some years, we have taken a small piece of cotton, saturated with sulphuric ether and kept it in the metal reservoir of the inflation pump. After using, we take this cotton out, wash the parts in boiling water, run denatured alcohol through it, and replace with new cotton. Every month or so, we soak all the metal parts in formalin. We keep the teat tube well protected with gauze. As an antiseptic to apply to the ends of the teats we use equal parts ether and tincture of iodine. Since they were introduced, we use wax dilators in the teats, instead of ligating with gauze or tape. We keep several pumps in the car, so if one breaks or we have several cases on one trip, we have a clean instrument on hand. We prefer the tube with a valve, preventing return flow of milk.

After having tried both the calcium chloride and calcium gluconate, we prefer the latter, administered subcutaneously, with an intravenous outfit, in the loose tissues of the neck. We do not say this is the best method, or that all wisdom begins and ends with us, but merely that we found it more suitable in our work. We have many cases in dark and filthy stables, out in the fields or in an old strawstack, Some occur in early morning before daybreak or in the evening after dark. Quite frequently, we find one rolled up against a barb-wire fence or down in a ditch. Others are nervous and swing their heads around. Some are wild as deer, and unless down for "the long count" are difficult to handle. If most of our cases occurred in clean, well lighted dairy barns, the situation would be different.

It has been demonstrated calcium gluconate is one of the best therapeutic agents to liberate calcium in the body, and it may be given intravenously, subcutaneously or intramuscularly. While it is slower in action than the chloride, yet

Typical milk fever in a grade cow

the effects seem to be of a more permanent nature.

At first, we used only one bottle of 250cc of a 10% sterile solution, or not quite one ounce of the gluconate, We noted that while the patient rallied, often she did not seem to have the strength to rise, so we began to use two bottles, or nearly two ounces of the calcium gluconate. Now, we often use 1,000cc of a 10% solution with excellent results.

Be sure there is no sediment or precipitate in the gluconate solution or complete absorption will not take place, and induration and even an abscess may result. To clear the solution, it should be boiled vigorously for a few minutes, and it should be crystal clear. Allow to cool until about blood warm, and then it is ready for use.

We usually inject 500cc in each site, as the tissues of neck are very loose. Be sure your "outfit" works, as nothing takes the joy out of life like a needle suffering with an esophageal choke. The first thing one knows the cork has blown out of the bottle and the solution is christening the operator's knees. To be ready for such a sad occurrence, which may occur in the best of families, we carry along an emergency supply of the solution and an extra intravenous outfit.

If there are eclamptic symptoms present, we give several ounces dextro-glucose dissolved in 500cc warm water. In addition to this, we usually administer 20cc sterile camphorated oil; a quarter grain atropin; a tenth grain of lobelin, and, where there is much impaction, a quarter grain of eserine. We often use DeVine's oral administration of equal parts tinctures nux, strophanthus and digitalis on the tongue. A liniment is rubbed over the back. Several gunny sacks full of straw are propped against the animal's shoulders, and she is well bedded and blanketed.

If the animal is not up in around four hours, we repeat the treatment, and, in rare cases, use inflation. In addition, we give a high rectal injection of warm, soapy water, and sometimes inject our stimulating laxative directly into the rumen through a trocar. We think those having had poor success with the calcium gluconate treatment have not used enough, or it may not have been thoroughly dissolved. These two factors are very important. We find absorption takes place in the tissues in a few hours, and in a day or so one cannot find the site of injection.

The results of this line of treatment have been very satisfactory. Usually, the client comes to see us in a few days, and as he exhibits a well worn and perhaps anemic checkbook, informs us the cow "never done better." She comes right up in her milk; there are no relapses or abscesses, and the method looks more professional than just "blowing up the udder." However, as we have already said, we have not entirely discarded inflation. A sensible combination of any kinds of treatment that will bring successful results is what the practitioner is after, and this is always subject to improvement and change. We hope the patient benefits by the improvement and that we get the change.

A LABOR SAVER IN DYSTOCIA

In obstetrical cases in small heifers and cows that persist in lying down, wrap a sack around each hind leg above the hock and tie the legs with a stout rope, tied so that it won't slip. With block and tackle, raise the hind parts high enough to allow abdominal viscera to drop away from the pelvis. Then just simply reach down and straighten out the mess, and your job is over in a few minutes. Try it once and you will never again go to an obstetrical case without a small block and tackle.

H. A. Taylor.

Imperial, Sask.

INJURY OF A MULE

I have a case that I would like some information as to diagnosis and treatment. Last year, one of my clients had a mule that started swelling between the front legs on the abdomen. His appetite remained quite good, but he gradually wasted away and died in the course of about two months. I tried polyvalent, vaccination, sodium cacodylate, tonic powder but to no avail.

This man now has another mule starting the same way. Both animals had plenty of exercise before they were affected.—A. H. W., Iowa.

Reply: From your description it seems possible that the mule in question has been injured by splinters on a partition or manger or a fence, and has become infected. Large doses of polyvalent bacterin are suggested and more important, as soon as a distinct abscess formation has occurred, open freely and give it good drainage. Internally, you might obtain some good results from the use of Fowler's solution, giving the maximum dose.—A. T. K.

Diseases of Shipped Cattle

By W. H. BAILEY, St. Joseph, Missouri

Parasitic diseases give but little trouble from a transportation view; thus, while very important to the general practitioner, no mention of them is made in this article. The limits as to space preclude going into detail as to pathology, and furthermore veterinarians in the main are quite familiar with most of the diseases that produce loss during transportation. We have made the following classification of the more important diseases, somewhat in the order of their importance and occurrence in transported cattle.

Infectious

Hemorrhagic septicemia
Keratitis
Blackleg
Anaplasmosis
Tuberculosis
Anthrax

Non-Infectious

ACUTE
Indigestion
Injuries
Hemorrhage
Heatstroke
Hypocalcemia
Railroad sickness
Dystokia

CHRONIC
Emaciation
Traumatic-pericarditis

Hemorrhagic Septicemia

This disease is one of the most peculiar in its relationship to predisposing factors. It frequently affects animals during shipping and trucking and afterwards on the farms.

While it is a specific disease, predisposing factors are, as a rule, very important as causative factors. While in some cases there may be other organisms associated, it more often exists as a specific disease, only the bipolar organisms being present in the tistues and fluids of the body.

In cattle, the immune serum gives remarkably good results if used early and in maximum dosage. In such cases the organisms may be found in great quantities in the blood stream before serum is given. Thus, the finding of the germ and this organism alone in the blood stream, and the early recovery following use of the specific immune serum surely affords conclusive evidence that this is a specific disease.

While it is often stated that the organism may be found upon the normal (?) mucous membranes, it is quite probable that it is more often true that it cannot be so found.

While apparently there is much variation in the virulence of and in susceptibility of animals to it, after all, we know but very little scientifically of these factors and thus it is difficult to explain many of the peculiarities of this disease.

Hemorrhagic septicemia is one of the important "shipping" and "trucking" diseases, because driving, rushing, crowding and exciting animals, and weather changes, close confinement and similar factors produce fatigue and disturb body balance or resistance. Heavy fills and change in feeding methods also lower the animal's natural resistance to this organism in particular.

The entrance of the organism into the bloodstream may be via wandering leucocytes, which engulf the organisms but are unable to destroy them and permit some of them to escape after the cell has returned to the blood stream, thus setting up a rapid septicemia. Predisposing factors become important to the degree that they lower the normal resistance (disturbance of the complex cell function).

While the disease is ordinarily a herd infection it may sometimes affect the individual. A few examples may be given.

A fine Jersey cow was found very ill early in the morning. She was very excitable, showing incoordination of the locomotor system to a degree that she would stagger about and fall when attempt was made to examine her. The animal was cast and the temperature at this time was 107° F. A sample of

jugular blood showed numerous bi-polar organisms in pure culture. Immune serum was given and the cow made a complete recovery within the day. No cases occurred in the herd.

Another cow, showing a group of mild symptoms, slight nervousness, slight elevation of temperature, slight increase in respiration, and a tendency to become more excited upon examination, was given the immune serum after the bi-polar organisms were found in the jugular blood and made a rapid recovery.

A very fat yearling baby beef, Angus type, was trucked into the local stock show and later in the evening was found down, struggling, high temperature, 109° F. and very rapid respiration. The animal was moribund. A sample of jugular blood showed numerous bi-polar germs in pure form. Autopsy revealed characteristic acute lesions of hemorrhagic septicemia.

In each of these cases, extreme care was used in procuring the blood samples. The laboratory examination showed pure hemorrhagic septicemia infection. In the latter case there were many animals directly exposed but no cases developed.

There are instances where, when this disease makes its appearance in a farm herd, the owner ships the apparently well animals at once. By the time they reach market, there may be some sick or dead. The "mad itch" type is sometimes observed in such circumstances.

Control.—Owing to the peculiarities of the disease and the different biologics that may be used, preventative measures should be in charge of veterinarians. We believe the Federal and state authorities should adopt some plan under which this work would be handled by competent veterinarians only. If this were done, many thousands of dollars of loss would be saved in almost all localities where cattle raising is an important industry. Proper records should be maintained, the proper biologic used in the individual case, and the work conducted in close co-operation with the regulatory officials.

Hemorrhagic septicemia may at times present itself in somewhat atypical form so that classical symptoms are absent, probably more so in young animals, and there is a probable heavy loss due to the cause not being found, particularly where laymen attempt to diagnose and treat animals as they are doing more or less in this state.

There are many instances where prevention methods are brought into disrepute due to ignorance of their action and mis-use of them.

A herd was treated with aggressin and some time later there were losses. The farmer secured bacterin and re-treated the cattle; the losses continued. Reluctantly, a veterinarian was called, who found a very heavy infestation of stomach worms. Suitable treatment prevented further loss.

Likewise in another herd which was re-treated, losses continued and a veterinarian found coccidiosis to be the trouble. In another case, feeders were re-treated due to losses some weeks after first treatment, and continued loss caused a veterinarian to be called, who found that sweet clover was at fault. Innumerable instances similar to the foregoing could be cited.

In the use of biologics, we are of the opinion that we are using a dosage that is too small. It is stated that repeated injections, starting with 4cc of the bacterin and doubling the dose later for two more treatments will produce a good degree of immunity. In sick cattle, the use of 20cc to 30cc of bacterin, repeated in twelve hours and followed by a dose of 15-20cc and later by 10cc doses daily, is recommended. In cattle not so severely affected, smaller doses, 10-20cc, are used in the beginning. However, we would expect better results from the use of the immune serum and after improvement, endeavor to anchor the immunity by one or two good sized doses of bacterin, though it is probable that an animal recovered from actual blood stream infection is actively immunized. If sick cattle will tolerate such large doses of bacterin, then apparently we should use either larger initial dosage or must be careful to use repeated dosage of the bacterin as a prophylactic.

We favor the use of a good sized dose of

the bacterin in cattle about to be shipped or trucked and then later on the farm, say in a week or two, if animals are normal, then use aggressin.

The use of aggressin in weakened cattle or in cattle that might be harboring weak strain of the organism upon the respiratory mucous membranes, may result in a flare up of the disease and losses. In normal cattle the use of the aggressin is unquestionably followed by active immunity but it requires a period of at least several days to produce it, a danger period during which the animals should be guarded carefully from the predisposing causes of this disease.

The use of the immune serum in the early stage of sickness is of value. It should not be neglected by reason of its cost.

While the disease is inclined to take advantage of weather condition, we may expect to find it occurring at any season.

Keratitis

This disease seems to be more severe this season than formerly, many cattle arriving at the yards showing partial or complete blindness. This increases the chances for damage during transportation. Some cattle show an extensive cloudy condition of the cornea, while others show little structural change but suffer from blindness as much as the others. There must be a tremendous loss in flesh during the attack and no doubt there is need for much more research as it seems that biological treatment might be improved upon.

Blackleg

A few cases happen during transportation. A stockman insisted on loading a lame calf in with another shipment. When the cattle arrived this calf was dead. The history was that calf had lain down and seemed very ill before car was put into the train at origin. Autopsy showed very marked lesions of blackleg. The caretaker was advised and the stockman had his herd vaccinated as soon as he learned the cause of the death of the calf. Sometimes a few calves will die of blackleg in the yards after unloading.

Anaplasmosis

We have observed a few cases, the symptoms and lesions do not seem as pronounced as in field cases, however we have been able to find the characteristic bodies well stained in the margin of the red cells. We believe that these cases have been in a rather dormant or chronic form and that lowered resistance has permitted the condition to become acute.

Tuberculosis

We see a few cases, in which the disease has become generalized and the animal much emaciated, so that death is brought about through exhaustion. In such cases as show no injuries, but show much emaciation and very extensive tuberculosis, fatigue would seem to be the immediate cause of death. Other than these type of cases, tuberculosis seems to be of no importance as a source of loss during shipping.

Anthrax

We have, fortunately, no experience with this disease at this market. There have been several times that it was suspected, but laboratory investigation proved negative. Why it is not more widespread, one cannot say. It would seem that the possibility for its occurrence would be quite favorable considering the fact that cars move through or near infected territories all the time. There must be some natural influences that prevent the development of the disease.

Acute Indigestion

This disease may be a source of much loss at times, existing either independently or in association with other pathological conditions. In cases that are alive when the market is reached, the bloating is sometimes so severe that immediate surgical relief must be given. In some cases, the bloat is pure gas and can be nicely relieved by using a large diameter hypodermic needle, while in those cases in which there is much fermentation, a trocar must be used because the bubbling ingesta would clog the needle. Overheating and acute indigestion often are associated.

In young animals, feeders, where sometimes a heavy fill is attempted, the indigestion resembles closely an infectious condition in that several may be affected at once, there may be prostration, fever, muscular incoordination, and nervous symptoms; but

careful laboratory examination of the fatal cases shows negative. We have seen cases die both in cattle being received and in cattle about to be shipped.

Injuries

There are some cases in fat cattle in which fractures occur, various bones being affected. In cases where there can be no reason developed as to cause, the fracture has probably been due to a sudden movement of the animal predisposed to fracture by bones lacking in proper strength due to a ration deficient in proper mineral elements.

Bruising of fat cattle is a cause of serious loss at times. This bruising begins at the time the stockman starts them to the local loading point, and continues through driving, sorting, and loading, and again in the stockyards. Some of it is unavoidable; no doubt much of it could be prevented. It is sometimes more serious in horned than in polled or dehorned cattle.

In overloading and in aged, weak, emaciated cattle, injuries while in the car frequently cause death or loss through condemnation.

Hemorrhage

At times there may be some loss due to faulty castration just prior to shipping. Even dehorning may cause death. Autopsy shows the wound and the pale, bloodless condition of the tissues. Rarely there may be internal hemorrhage due to rupture of large blood vessels.

Heatstroke

Fat cattle become overheated when shipped both by rail and truck. The temperature exceeds 110° F. before death. Sometimes cattle become overheated in the stockyards. The practice of feeding fat cattle corn chop and keeping them off water during warm weather cannot be too strongly condemned, and most stockmen have given this up. With such practice during a warm sultry day it is not uncommon to find several animals in a load severely affected. Cattle moved by truck are more liable to become overheated by reason of being exposed to the sun and also because there is more physical exertion in trucking.

Some fat cattle suffer as much from seasickness in trucking as from the heat. Both indigestion and overheat affect some animals and death often results.

Hypocalcemia (Milk Fever, Parturient Paresis)

This disease may happen at any time during transportation of dairy cattle. While it occurs in varied forms, as a rule these cases are very severe. While the blood shows a calcium content below normal and the administration of calcium restores the animal to health the cause may be a disturbance of the endocrine system. Excitement, fatigue and crowding seem to favor its development. It occurs in the heat of summer and during the coldest weather as well. One very cold winter morning we found two animals lying stretched in a well bedded box car. These were both prostrated and much bloated. The owner was with them and his word picture, profusely illustrated with profanity, of the terrible rough handling was a masterpiece. However, simple udder inflation brought about a nice recovery and the owner failed to put in a claim.

In railway cases, we find a marked paresis of the digestive organs with intense bloating, and we sometimes relieve this by use of a 14-gauge needle. We also draw the urine. The respiration is shallow and the heart action uncertain, irregular. There are groaning and grinding of the teeth also. We have used filtered air, calcium chloride and calcium gluconate with equally good results. We have had relapses with all three methods. The calcium chloride is the most active and also the most dangerous method of the three. Udder inflation with calcium gluconate given intramuscularly is, in our judgment, the safest method.

We believe that if the calcium chloride is used in a 10% solution; if care is taken to warm the solution to blood heat; if one uses a minimum of 125cc, and if it is injected very slowly into the jugular vein, that no sudden deaths will occur. The technique, by use of the tom-cat catheter, as devised by Dr. J. E. Weinman, Lincoln, Nebr., is excellent. The solution *must* be injected within the jugular vein.

There is apparent shock in some cases

where calcium chloride is used and it is advisable to give a glucose solution prior to the calcium solution. We do not believe the mixing of the two is of any certain advantage. Calcium solutions tend to throw down precipitate and one should be sure that the solution is clear, filtering carefully if necessary and warming to blood heat. At present we have no entirely satisfactory calcium solution for intravenous use and one should use them with utmost precaution.

In an unusual case that had calved five months previously, was down with a complete paralysis of the fore quarters, subnormal temperature and constipation, 100cc of 20% calcium chloride was given, also 100cc of 20% glucose solution. No immediate effect. No noticeable shock. The next morning the cow was up and remained normal. In another case of similar nature, all treatment was of no avail.

Railroad Sickness (Railroad Paralysis, Atypical Milk Fever)

This disease seems to be similar in pathology to hypocalcemia and occurs in fat, heavily pregnant range heifers and cows. Long, very dry periods, together with long distance transportation, seem to favor its development. In these cases, a well developed calf can be located in the uterus and milk is found in the udder. Some are prostrated, some are down but still up on the sternum. Some show subnormal, others show normal, and a few may show slightly elevated temperatures.

Air inflation, strychnine, adrenalin and other medication seem to be of no benefit. If an animal does get on its feet, it may die later. A fetid diarrhea develops in some cases. Early slaughter seems to be the best method to use in salvage of such cases. We have not had opportunity to try the calcium solutions to any extent but we failed in one case, although both calcium solutions and glucose were used. The condition may be more of an auto-intoxication and general breakdown in the physiological balance of the body. There is no reason why such cases will not develop when hauled by truck.

Dystocia

Cattle that are far advanced in pregnancy may at times become sick while being shipped and die during the trip. One may find the cow in a fresh condition while the calf is decomposed, bloated and wedged in the passage way. Prolapse of the uterus may occur in some cases.

Emaciation

Some years, the loss due to this condition is considerable. Cattle shipped several hundred miles, arrive in an exhausted condition. They are simply living skeletons. Often they are aged and thus are very poor subjects for shipping. Here and there will be found individuals that are blind and others with extensive cancerous condition of the eye.

Traumatic Pericarditis

As a rule, these animals have been affected a long time, of course we sometimes see very acute cases. The heart sac may be much thickened and a very large amount of pus found enclosed. In other cases the pericardium is very thickened and firmly adherent to the heart. There are numerous variations. Sometimes we can locate the foreign body and sometimes not. Wire and nails are more often found. Edema of the subcutis is not always evident. We have found cases where the imbedded object only recently had penetrated the sac and lacerated the heart, presenting an acute epicarditis with exudate. In some cases the animal is thin and rough haired, while in others it is in good flesh. In some of these cases there are extensive nephritis and hepatitis. It is very remarkable how some of these cases live long enough to get part of the way to market.

Bang's Disease*

By A. T. KINSLEY, Kansas City, Missouri

BANG'S disease is primarily an economic problem that concerns the livestock industry. It is essentially a disease of pregnancy, however, an occasional unbred heifer may harbor the infection and an occasional bull may become affected.

The economic significance and distribution of this malady is or should be common knowledge, Suffice it at this time to say that it has been estimated that 18% of breeding cattle and 50% of cattle herds, are affected. Bang's disease as a public health problem in the judgment of the writer has been greatly over-rated.

B. alkaligines is accepted as the causative agent of Bang's disease. The cultural peculiarities of these microbes are not of particular interest to a society composed largely of practitioners. The channel of entrance of the causative agent of Bang's disease is primarily by way of the mouth, either in feed or water. The infection may also be introduced through the ocular mucosa, direct through the skin, through the mucosa of the genital tract and finally infection may take place through the udder *via* the teat.

There is apparently a predilection of the organism of Bang's disease for the gravid uterus. The organism may also be found in the mammary gland. Uterine infection by the germ can occur apparently at any time during the gestation period. It is also of interest to note that the uterus becomes free of the infection in from 30 to 40 days after abortion or calving.

Mammary infection is significant because of the spread of the infection through the milk. According to some investigators, over 30% of cows that give a positive serological reaction eliminate the abortion organism in the milk, not continuously in most instances, but some time during the lactation period. Bang's disease is insidious; the period of incubation appears to vary from a few weeks to several months.

The *B. alkaligines* is disseminated in uterine discharges and in milk of infected cows. Feed and water in feed lots or pastures may thus become contaminated. Thus, the affected cow is the primary source of the infection, and it is probable that over 95% of infected herds have been infected by the introduction of a diseased cow. It should not be implied that the bull should be disregarded as a source of abortion disease; however, he is, according to most investigators, a minor factor. Abortion disease is a chronic malady and often it is not possible to trace the infection.

Heifers are apparently more susceptible to the abortion infection than are mature cows. It is common knowledge that there is a larger percentage of first calf abortions than there is of the second or third pregnancy. Affected cows do not always continue to abort. In fact, over 50% may abort once, less than 25% abort a second time and only a small percentage will abort a third time. In other words, there is an apparent immunity developed in an infected herd against Bang's disease. This should be given proper consideration in the control of Bang's disease.

The agglutination test is the most reliable method of detecting Bang's disease. Who should do agglutination testing? It is the judgment of the writer that this test is a laboratory test and should be done by a laboratory technician. Agglutination in a 1:25 dilution is considered a reactor by some. Others consider 1:50 reactor a safe animal to leave in a negative herd. There is no standardization of antigen, procedure of the test or the interpretation of results.

In relation to the agglutination test,

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the following facts should not be lost sight of.

1. Some infected cows become positive reactors only after aborting.
2. Some infected cows abort and never react.
3. Some positive reacting cows do not abort and are true breeders.
4. A positive reaction may be caused by biologics.
5. Calves drinking milk from positive cows usually give a positive reaction, but as a rule, are not infected.
6. Some positive cows become negative.
7. Other protein reactions may interfere with the Bang agglutination test. (hemorrhagic septicemia).

The control and prevention of Bang's disease is the major problem, confronting the veterinary profession. Foot-and-mouth disease has been eliminated from this country eight different times, and pleuro-pneumonia once by the so-called slaughter method. Tuberculosis is being reduced by this same method. So also can Bang's disease be ultimately reduced to a minimum by the universal application agglutination test and slaughter of all reactors, but the expense of this method is prohibitive.

It is possible to build up an abortion disease free herd and maintain it, but it does not seem to be a feasible plan to be universally adopted. It is also possible to establish a herd of average breeding efficiency by the selection of cows that have aborted, and obtained an immunity, but because of the occasional carrier a large percentage of first calf heifers in such a herd would become infected and abort unless they are vaccinated.

The successful control of any disease is dependent upon the adoption of a method or combination of methods that are practical and financially justifiable.

The two-herd method has been suggested as a means of controlling Bang's disease. This method can be carried out by well-to-do farmers, but it is not a feasible plan for all cattle raisers.

A third suggested method of control of Bang's disease is by the combined use of sanitary measures and biologics. Many practitioners are now firmly of the belief that the use of abortion vaccine will do more toward controlling Bang's disease than all other methods combined. The vaccine is apparently equally applicable whether it is used prior to or within two or three months after breeding. On one farm all heifer calves at one year of age are given the live culture vaccine. This is repeated when the calves are approximately two years old. On this particular farm the losses incident to abortion prior to this method of procedure was over 50% and now a 90 to 95% calf crop is being produced.

We believe it advisable to use all ordinary sanitary methods that are applicable and to vaccinate. We believe also that one large dose of abortion bacterin given monthly for the last four months of pregnancy will diminish the losses incident to abortion disease.

Interstate Regulations

More than 20 states require that all breeding and dairy cows that are shipped into those states be accompanied by a chart showing that they have given a negative serologic reaction. The agglutination test will detect the majority of reactors. However, this test is made in most instances in public stock yards or on farms just before shipment and there is a possibility of error because the cattle are tested regardless of the stage of pregnancy, calving, etc.

In most, if not all states, where the agglutination test is required the authorities do not advise the shipper of the necessity of keeping shipped in negative cows apart from other cattle. Consequently, many such shipments of non-reactive cows are placed in infected herds and become infected and abort.

Most authorities have made no provision for the disposal of positive reactors that are taken from interstate shipments, particularly in public markets.

As a matter of fact, the majority of the

positive reactors are sent to the country as feeder cattle and frequently into those states that require a negative reaction of breeder and dairy cattle.

Conclusions

1. Bang's disease is an economic problem.
2. Before launching any extensive control program, based upon the agglutination test, the antigen and interpretation of the test should be standardized.
3. It is possible to develop a Bang's disease free herd by repeated testing and removing reactors, but the ultimate eradication by this method is problematic.
4. It is possible by combining applicable sanitary methods and biologics to economically increase the calf crop to practically normal.
5. The Bang's disease interstate regulations are apparently premature and an added expense, without a fair return to the cattle industry.

INJURY TO TONGUE OF BEAGLE HOUND

I wish to report a case in a part Beagle female, aged four years. When first brought to the hospital three weeks ago, she was salivating profusely and had a subnormal temperature. The pulse was very rapid and almost imperceptible. Upon examining the mouth, I found the gums highly reddened, foul breath and a decided line of demarcation at the junction of the posterior and middle thirds of the tongue. The anterior two-thirds was necrotic.

By carefully questioning the owner, the information was elicited that quite a bit of corn meal had been fed. However, the remainder of the diet was not at fault.

The owner was a graduate nurse and I told her the prognosis was unfavorable. However, I sterilized instruments and injected 10cc of a 50% solution of dextrose in the external saphenous vein. Three days later, the owner thought the dog was dying. However, she didn't die. After another week, the animal showed signs of wanting to eat. She had been feeding broths, etc., with a tube. When the tongue sloughed off, which was about seven days after I first saw the animal, I cleansed out the mouth with neutral acriflavine and injected 20cc intravenously. From then on the animal began to improve.

The nurse was in today and the animal has all the appearance of good health, tries to pant with its stub tongue and seems sound in every way. I wonder if it was blacktongue, that ailed this animal, or what was it?—C. L. S.

Reply: I cannot come to any absolute conclusion as to whether or not you were dealing with blacktongue.

There were some symptoms that indicated this disease, but the condition of the tongue would indicate to me that it was not blacktongue but an injury that caused the sloughing of the tongue. The fact that this animal had been fed corn meal would not necessarily mean that the condition was blacktongue, provided the rest of the diet had been all right.

My guess is that this animal's tongue came in contact with some irritant, or had been ligated for several hours, or for some other reason sloughed off and that the condition is not the disease known as blacktongue.—H. J. M.

VICIOUS BULL

A client of mine has a very valuable bull. It is very vicious. He has tried various methods of restraint, leather blinds, etc., but the animal tears them off. Now he has come to me and asked me to blind the bull by operation or drugs.

I come to you for counsel. Perhaps you have known of similar incidents and can suggest a remedy.—A. R. B.

Reply: When a bull has developed a habit of viciousness it is rather rare that such a vice can be corrected. The chances are that should any method be resorted to that would interfere with the vision, the animal will become still more vicious. It would appear that the best procedure in such a case would be to turn him into bologna.—A. T. K.

Anemia of Young Pigs

By J. S. FULTON, University of Saskatchewan, Saskatoon

ANEMIA of young pigs has been described by McGowan and Crichton (1) as a condition caused by an iron deficiency. These workers found that ferric oxide, when given in suitable quantities to sows, prevented and cured the disease. Although Schofield (2) and others agree that a decided anemia appears in young pigs which are closely confined, they do not, like McGowan, find ferric oxide, when given to the dams, of value in prevention or cure.

Schofield, however, finds that iron, when given to young pigs, has a decided effect on the prevention of anemia, and when given after the clinical symptoms appear, the animals soon return to normal.

Doyle, Mathews and Whiting (3) were of the opinion that some factor in outside conditions tended to prevent anemia in suckling pigs; later they showed that sunlight was effective in preventing anemia, but that ultra-violet irradiation was of no value when pigs were kept indoors.

Hastings (4) is of the opinion that the lack of exercise is the cause of anemia and that the disease does not appear among active pigs which are given their freedom. He further states that the cause of anemia is unknown, but is likely due to bacterial products absorbed from the intestine. This statement he immediately contradicts when he writes: "The fatty degeneration of the liver is not the result of anemia but the cause of it."

It would appear that the ideal environment for suckling pigs is one in which there is ample sunlight, suitable soil and vegetation. It would also seem, from the results obtained in the following experiments, that the disease can be prevented and even cured when only one of these three factors, soil, is supplied.

In this experiment seven different litters were used and from each litter seven healthy pigs, of uniform size, were selected. When three days old the selected animals were weighed and a complete blood count and hemoglobin determination made for each animal.

After the first examination the litters were kept under different conditions and blood examinations made every tenth day. Some litters were kept inside and away from direct sunlight; some were kept in pens with board floor runs, where the animals had direct sunlight but were away from soil and vegetation; while others were allowed to run in paddocks, where the soil was loose and suitable for rooting.

As the experiment progressed it became evident, not only from the result of blood examinations but from the appearance of the animals, that access to, or lack of, soil, had a marked bearing on the health and development of the young pigs.

Litters which had been in paddocks from birth gained weight rapidly, were strong and had good color, while those which had been denied soil, although in fair condition, were small and showed a decidedly yellow skin and pale mucous membranes. The symptoms of anemia became more marked the longer the young pigs were kept away from soil and, in the course of a few weeks, a number of the animals became so weak that they were hardly able to move around.

Pigs kept in board floor houses, whether having direct sunlight or not, if supplied with soil, made rapid gains and did not develop anemia. In fact, it has been found possible to keep young pigs indoors and away from direct sunlight, if given soil, for as long as eight weeks without any apparent ill effects.

That the effect of different types of soil might be determined in the prevention of anemia several litters were used in a second experiment, the records of which are not shown in the following tables. From the results obtained it would appear that the "that" which is required to prevent anemia is present in surface soil

containing considerable humus; clay subsoil, sandy sub-soil and in soil which has been sterilized by dry heat.

Pigs supplied with these various types of soil from time of birth, whether kept in houses with or without direct sunlight, did not develop anemia. It was also true that pigs which were denied access to two weeks old, however, the picture is totally different, particularly as to quality of the cells and to a lesser degree as to quantity.

There is a decided poikilocytosis and polychromatophilia, microcytes are numerous and in a number of cases normoblasts are present. At this stage there is

	Age in days	Weight in grams	Red blood count	White blood count	Hemoglobin	Differential count			Remarks
						Poly.	Mono.	Eosin.	
GROUP No. 1—Kept in piggery for two weeks and then removed to paddock.	3	.....	4,330,000	15,742	45.07	57.50	42.50	0	
	13	.....	3,110,000	10,343	33.32	31.83	68.16	0	To paddock.
	23	6,232	5,108,333	16,029	64.48	36.14	62.85	1	
	32	8,653	5,625,714	25,157	86.80	35.66	61.66	2.66	
	42	12,776	6,275,714	27,150	86.14	39.57	54.57	5.85	
GROUP No. 2—Kept in piggery for two weeks and then removed to paddock.	3	.....	4,314,285	15,042	45.87	65.28	34.52	.166	
	13	3,808	3,145,000	14,516	37.13	27.00	72.83	.000	To paddock.
	23	4,924	4,978,571	14,860	55.51	36.40	63.00	.6	
	32	7,774	5,934,000	35,780	73.44	35.75	60.87	3.62	
	42	10,314	6,192,000	33,075	82.70	25.5	62.40	12.10	
GROUP No. 3—Farrowed outside.	3	.....	4,122,857	15,328	43.41	49.28	50.57	.....	
	13	4,608	5,068,000	16,083	60.44	37.92	61.78	.285	
	23	6,503	6,785,714	17,671	78.68	39.35	59.00	1.357	
	32	9,343	7,075,714	20,857	80.93	29.00	64.71	6.000	
	42	13,797	7,224,286	29,171	92.91	28.00	57.35	14.640	
GROUP No. 4—In piggery with board floor.	3	1,889	3,212,855	18,429	37.78	54.68	44.60	.411	
	13	3,746	3,294,286	14,757	36.51	27.57	72.28	.142	
	23	5,564	3,620,000	11,629	28.66	26.07	73.85	.071	
	32	7,044	4,022,857	16,457	28.20	23.50	75.64	.857	Soil added.
	42	8,563	5,385,714	24,386	59.67	29.55	67.72	2.680	
GROUP No. 5—Farrowed outside.	3	2,179	4,050,000	15,650	44.02	63.50	36.50	.....	
	13	4,271	4,931,000	17,700	68.19	36.78	62.42	.62	
	23	5,190	5,871,429	27,786	80.64	40.57	53.92	5.50	
	32	6,694	5,354,286	34,200	70.38	31.00	62.64	6.35	
	42	9,122	5,662,857	38,829	75.92	21.58	70.50	8.66	
GROUP No. 6—Kept in piggery all the time.	3	1,574	3,817,857	13,420	53.54	44.00	55.85	.142	
	13	3,467	2,878,571	18,071	29.32	37.89	61.32	.785	
	23	4,973	3,568,571	15,314	25.14	23.08	75.61	1.300	Soil added.
	32	6,484	5,085,714	17,286	55.74	19.92	76.28	3.780	
	42	8,831	5,482,857	22,020	69.07	22.57	74.57	2.850	
GROUP No. 7—Kept in piggery with board walk.	3	1,354	3,307,142	10,028	50.69	53.50	46.35	.5	
	13	4,007	3,134,285	16,133	53.76	29.00	70.71	.285	
	23	6,806	5,045,714	20,833	66.45	39.78	59.00	1.210	Soil added.
	32	9,944	5,425,714	15,643	79.56	23.00	75.33	1.660	
	42	13,506	5,758,571	27,166	78.90	23.14	75.57	1.28	

soil and allowed to become anemic very quickly recovered when any one of these types of soil was supplied.

The blood picture of pigs three days old presents nothing striking; the red cells appear normal in size and shape and stain evenly with the usual stains. If the animals are confined until they are about a reduction in the number of erythrocytes, although not in relation to the marked decrease in the hemoglobin content. This can readily be understood when the semi-disintegrated condition of the red cells is considered.

The change in the cellular content of the blood of young pigs is not confined

to the red cell but is quite decided in the leucocytes, both as to number and the percentage of the various cells. When the pigs are three days old the leucocytes may be more numerous than they are ten days later. About the twenty-fifth day there is usually a decided increase, and before the forty-second day the number of leucocytes per c. mm. may be double that determined when the animal was three days old.

It has also been noted that the original relationship between polymorphonuclear cells and mononuclear cells is not maintained long after birth. Differential counts show that at three days polymorphonuclear leucocytes predominate and the eosinophiles are almost altogether absent When the animal is thirteen days old there is a drop in the percentage of the polymorphonuclear cells, with an increase in the percentage of mononuclears. This change continues until the percentage of mononuclears is greater than that of the polymorphonuclears. When the pig is mature, again a change takes place, polymorphonuclears predominating.

It will be noted from the following table that the pigs which were closely confined had a lower percentage of eosinophiles than had the pigs which were allowed to run in paddocks. This is particularly striking in groups 2 and 3 when compared with group 7. It may be here mentioned that none of the pigs showed any clinical signs of parasitic infestation during the experiment.

Although it has been found that soil given to young pigs, which are closely confined, prevents anemia and will also cure the condition, it cannot be said that the young animals thrive as well as those given their freedom. Group 3, which ran at large from birth, made the best gains and appeared more healthy when forty-two days old than any of the other experimental litters. The average weight, erythrocyte count and hemoglobin content of group 5, which were also at liberty from birth, was markedly reduced by two of the litter, which, for some undetermined reason, did not thrive well.

The lesser gains of the confined groups might in part be due to the reduced milk supply which was quite apparent among the penned sows.

As already mentioned by others, we find that young pigs thrive better when allowed to run at large from time of birth.

It has also been shown that soil, with or without sunlight, will prevent and cure anemia among pigs which are closely confined.

I wish to acknowledge the assistance given by the Animal Husbandry Department of the College of Agriculture in carrying out this work, whose co-operation was necessary and much appreciated.

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SWINE POX

Swine pox, or variola suilla, is a specific filterable virus disease characterized by erythema, papules, vesicles and pustules. The eruptions usually appear on the ears and back. There is a slight rise of temperature. The disease runs its course in about ten days and is usually a relatively mild affection in this country. In some European countries it is more severe. If anti-hog cholera serum and virus be given during the early stages of swine pox, there may be a very severe reaction and extensive losses.

Some practitioners in this country have reported a malady characterized by dullness, temperature up to 108 deg. F., diminished appetite, conjunctivitis, purple discoloration of the skin of the ears and abdomen. This malady is apparently most severe in shotes weighing from 100 to 200 pounds. In foreign countries swine pox is said to be most virulent in small pigs. Whether or not this American malady is swine pox has not been determined.

A. T. Kinsley.

Kansas City.

Field Experience with Anaphylaxis

By FRED M. MAXFIELD, Gilman, Iowa

THERE are various terms used for this reaction — hypersusceptibility, serum sickness and vaccination shock being the most common when speaking about this reaction as seen in pigs. This phenomenon differs from idiosyncrasy in that the former needs no immediate[1] medication, and the latter usually does. At least there is no very decided response in treatment in the former trouble and there is a very decided response in the latter condition. They are alike in that one is rarely capable of distinguishing the susceptible animal before the attack.

Anaphylaxis, as witnessed in the field by the writer, dates back to 1914, the year he entered practice. It occurs in large animals especially following intravenous administration in maximum doses of any anti-sera or anti-toxin. We have seen it in young animals following the injection of bacterins. Especially the calf scour bacterin, as well as with subcutaneous administration of anti-hog cholera serum. Leaving out rabies vaccine, this shock has been witnessed with most other vaccines. Not so many years ago veterinarians who administered anthrax vaccine reported occasional cases of fatal anaphylaxis.

Anaphylaxis mortality is very low and we have fatal reactions only in very young animals[2] and in mature animals with pulmonary abnormalities,[3] a finding verified by autopsy. We believe in postmortem examination of every fatal case, young or old. In our experience the autopsy has told the story.

In baby pigs under a month old and puppies, age and condition seems to have a direct bearing to susceptibility.[4] Otherwise they have no relation. Neither the method of administration nor the temperature of the product have little if any bearing on the condition, except where maximum quantities are administered intravenously. Atmospheric and climatic conditions have no influence on producing or warding off the reaction. Feeding methods have little if any importance. In baby pigs and puppies they may be a predisposing factor. This reaction has occurred as often in the fall and winter as it has in the spring and summer; just as often in early morning or late evening as in the heat of the day.

Anaphylaxis has been noticed by the writer in human subjects following administration of diphtheria antitoxin, tetanus antitoxin and typhoid vaccine. We have witnessed the reaction following administration of blood, dilute clear, and concentrated clear anti-hog cholera serum with and without virus.

Our first fatal case was witnessed following an injection of whole blood serum in 1914. A post mortem examination showed the bile ducts blocked with ascarids. In 1917 a fatal case occurred following use of dilute clear serum. Autopsy revealed extensive lung congestion.[5] In 1921 a fatal case followed concentrated clear serum administration. Autopsy showed pulmonary atrophy.[6] In 1926 a fatal case followed injection of concentrated serum and we found a prenatal diaphragmatic hernia.

This shock in matured animals is not so frequent nor so pronounced as in young animals, and the duration is shortened. Asthma[7] is the great predisposing factor of anaphylaxis in man and urticaria is the most constant and often the only reaction in matured animals. In suckling colts, calves, lambs and puppies the reaction is very pronounced and the duration approaches that as seen in pigs under five weeks old; epileptic reaction[8] in pigs under five weeks old is alarming and severe.

Our experience in practice has revealed no fatal reaction[9] in any half-grown or matured animals, except where post mortem studies showed pulmonary involvements. With the exception of baby pigs under a month old we have never witnessed a reac-

tion in pigs where hemorrhagic septicemia[10] aggression was given at the time of serum and virus administration.

We use these reasonable precautionary measures: In swine, especially in pigs under five weeks of age, we insist upon at least eight to twelve hours fast (both feed and water) to eliminate to a great degree the nausea and vomiting. The pigs are grouped into two or more bunches and only those immediately ready for vaccination are placed in the catching pen. The majority of the herd is permitted to rest quietly. Excitability, continued exertion and the subsequent muscular rigidity and nerve tension have a direct predisposing influence on the occurrence of the reaction.[11] In baby pig vaccination, that is, pigs under five weeks of age, we want five pigs caught ready for treatment. Each in turn is given the dose of virus and then we start with pig number one and go down the line with the serum injections. We insist on isolation; absolute quiet and abundance of fresh, cool air passing over any and all, epileptic reaction, patients.

Comment: Doctor Maxfield's conclusions seem to differ in a number of respects from conclusions drawn by others. The following numbered paragraphs referring to exponents in the text seem pertinent:

1. An idiosyncrasy does not become manifest until that to which the animal is susceptible is introduced.

2. The records show that practitioners have reported the death of mature cows from an anaphylactic shock induced by the injection of 5cc of bacterin.

3. The pulmonary abnormalities are frequently, if not always, a result rather than a cause of an anaphylaxis.

4. It is apparent, at least, if one depends upon reports, that heated anti-hog cholera serum is more prone to produce an anaphylaxis than unheated serum.

5. The lung congestion it would seem was a result of an anaphylaxis; not the cause of susceptibility to it.

6. Pulmonary atrophy it would seem, is a rare condition. There is invariably a pulmonary edema and an apparent diminished volume of blood incident to the edema.

7. It is by no means certain that asthma is an important predisposing influence, however, as an anaphylaxis is associated with dyspnea this would probably be aggravated in an asthmatic.

8. "Epileptic" has a very definite meaning not associated with anaphylaxis; its use to designate an anaphylactic reaction seems objectionable on the ground of tending to confusion.

9. If we may judge by the reports of others, anaphylactic shock may and does occur at any age. The pulmonary lesions found in such cases are the result, not the cause, of the condition.

10. On the basis of what is known there seems no logical reason to suppose that the administration of hemorrhagic septicemia aggression could prevent the occurrence of anaphylaxis. Except the author or others have observed this in a large number of cases, we must conclude the author's observation to be the result of a coincidence.

11. The influence of nervousness or muscular rigidity or anything else other than the hypersusceptibility of the animals as influencing anaphylaxis seems very questionable.

MILK FEVER AT AGE SEVENTEEN

A case to which I was recently called strikes me as being most unusual. At least, in 27 years' practice, I have not had a similar case.

This was a case of milk fever in a registered cow just past 17 years of age, and it was the first attack of milk fever this cow has ever had in her long period in the dairy. Being a registered animal, of course her age is known to the day, and I have personally known of her throughout this time, know her age to be as stated and that she has not previously had milk fever.

She was given calcium gluconate hypodermically and intra-muscularly and recovered promptly.

Troy, O. T. H. Dettman.

ANEMIA IN YOUNG PIGS*

Anemia in suckling pigs is now fairly generally recognized as an important disease. It appears quite certain that this disease is responsible for a large portion of the disappointing results which follow attempts to raise young pigs inside of central hog houses and barns. The cause of anemia is the failure to supply the young pigs with what is needed for normal blood production. If the pigs do not store up sufficient blood-forming materials before they are born, they will develop anemia within two to five weeks after birth if they are obliged to subsist on the mother's milk alone.

Some pigs are anemic at birth and die within a few days. On the other hand, pigs are occasionally able to escape anemia even though they are kept inside on concrete floors during the nursing period. It is a well established principle that supplying good pasture for the brood sow and supplementing when necessary with an adequate ration without over feeding during the gestation period are important steps toward insuring vigorous pigs at farrowing time. Ordinarily, however, it is not possible to feed and manage the brood sow during the gestation period in such a way as to consistently prevent anemia in the young pigs which are kept indoors for three or four weeks and fed nothing but the sow's milk during the first half of the nursing period.

The prevention of anemia is of the greatest importance, because, if the disease once develops, it may cause serious death losses and also do lasting damage to the pigs which survive. Allowing the young animals to have access to blue grass sod, beginning within the first week after farrowing, has proved to be an effective means of prevention.

If the pigs must be kept indoors, pieces of sod may be placed in the pens where the young animals can have easy access to it. A better method, if the weather permits, is to give the pigs easy access to blue grass or some other good pasture. The sows may be kept confined in small pens while the pigs are allowed to range over the pasture.

Access to soil which is free from sod also provides considerable protection against the disease.

*Notes from an address by L. P. Doyle, Lafayette, Ind., at the Annual Meeting of the U. S. Live Stock Sanitary Association, Chicago, Dec. 1-3, 1931.

LAPARO-GASTROTOMY IN THE COW

The following technic for laparo-gastrotomy is used by the writer and shows some variations from the usual procedure:

No. 1. Attach leg chains to hind legs and put a bull leader in the nostrils.

No. 2. Shave and disinfect the operative field.

No. 3. Inject 0.25% solution Butyn dermally and subdermally in a straight line, perpendicularly.

No. 4. Make a downward incision through skin over the anesthetized area.

No. 5. With a long slender needle, inject 0.1% solution Butyn into the abdominal muscles and the peritoneum.

No. 6. Make another perpendicular incision through muscles and peritoneum.

No. 7. Run arm through incision down over the anterior border of rumen and note if any adhesions are present. If so, do not attempt to break down adhesions as it causes added distress and also opens up a new area for infection.

No. 8. Grasp as much of the rumen in your hand as is possible and draw it through the incision. Grasp the lower part with a pair of large uterine forceps. Lock the forceps and let hang downward (see A in illustration).

No. 9. Attach vulsellum forceps to rumen at upper commissure, and have assistant stand on the opposite side of the cow; hold them in an upright position (see B in illustration).

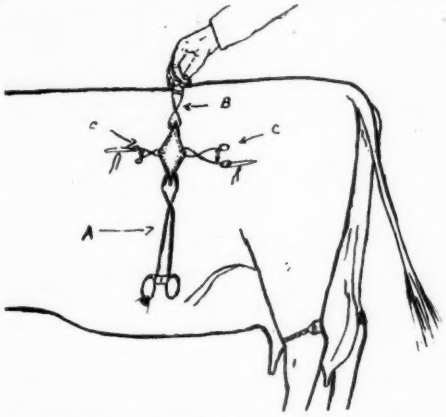
No. 10. Cut a vertical incision through rumen between the jaws of upper and lower forceps.

No. 11. Grasp cut edges of rumen midway on either side with a couple of pairs of tenaculum forceps and draw sideways as far as possible, anchoring them to a

thread run under the skin. This leaves a large opening that allows entry of arm and covers over skin and muscles incision, preventing contamination of operative field (see C, C in illustration).

No. 12. Insert arm and search for foreign body in reticulum.

No. 13. Remove tenaculem forceps, which allows loose flaps to come loosely together, and starting at superior end, place a row of uninterrupted suture, of No. 3 Chromic gut, the full length of incision and



then sew back upwards burying first row of sutures and tie loose ends together.

No. 14. With hypochlorite solution wash any particles free and remove the large forceps allowing rumen to drop back in place.

No. 15. Suture the peritoneum and muscles separately with catgut and place a row of linen sutures through skin, leaving a small opening at lower end for drainage.

No. 16. Dress wound with collodion or tar.

No. 17. Collect your bill.

G. A. Jones.

Sedro-Woolley, Washington.

From 1924 to 1929, inclusive, there were 258 milk-borne epidemics, involving 10,906 people, and 371 deaths. Milk-borne epidemics have stimulated the inauguration of laws and ordinances regulating milk production and distribution.

ANESTHETIZING POULTRY

It is improbable that there will be a general need for the application of an anesthetic for poultry. The value of the individual bird rarely justifies the expense of operative procedures which would require the administration of an anesthetic. There are instances, however, where anesthetizing the birds greatly facilitates experimental study.

Chloroform and ether have not proved satisfactory in the vast majority of cases. The respiratory arrangement of the fowl varies greatly from that of mammals. The relatively large air sacs apparently hold the vapor of either chloroform or ether, which is absorbed rapidly into the system, terminating in respiratory failure.

The writer found it necessary to perform a series of major operations which could not be successfully carried out except under general anesthesia. Through a surgeon friend, it was learned that he was using, experimentally, sodium amytal, manufactured by Eli Lilly & Company of Indianapolis, Indiana, with very gratifying results. Since the period of narcosis was quite prolonged it was decided to observe its action in poultry.

The wing vein was selected as the sight of injection, and care taken to introduce the solution slowly, not to exceed 0.5cc per minute. It was found that by diluting one-tenth gram sodium amytal in 1cc distilled water was sufficient to completely anesthetize birds weighing eight pounds. Lighter breeds, such as leghorns, anconas, etc., require from 0.5cc to 0.75cc.

The state of anesthesia is complete and sleep is induced for from one to four hours. The rapidity in which loss of consciousness occurs is remarkable. If the solution is injected in the amount and at the rate above mentioned, in from thirty seconds to one minute loss of consciousness is complete.

As a result of these experiments it would seem that sodium amytal offers a solution of the problem of anesthetizing poultry.

V. C. Fretz.

Omaha, Nebr.

A Short Review of Army Veterinary Service During the War*

By MAJOR GENERAL SIR JOHN MOORE, KCMG, CB, FRCVS,
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Introduction

After twelve years of peace there are perhaps few people who have an adequate conception of the enromous number of animals which took part in the late war, and of the great services rendered by them during the four and a half years deadly struggle. Their achievements and the value of their services have not yet received that public recognition and appreciation which were so highly merited. Nevertheless, they participated in those dangers, difficulties, losses, and incapacities which are always incidental to war, and it is right that they should be counted as elements in victory. Indeed, it may truthfully be claimed that the ultimate defeat of the Central Powers, Germany and Austria, was in a large measure due to their inability to obtain horses for remounting their Armies. A consideration of resources to meet a protracted war, and a study of the map of Europe will make this abundantly clear.

Resources and Remounting

Germany, though credited with over 4,000,000 horses in pre-war times, of which nearly 3,000,000 were in Prussia, was an importing country. She bought on an average 21,000 annually from Belgium, taking, it was said, the best of the Ardennes horses. She was also credited with taking 16,000 annually from Denmark, many of them for light draught work. Altogether her annual import returns showed a little over 100,000. The best material was almost entirely appropriated to supply the demands of the military authorities, the remainder being doubtful for military purposes. Austria-Hungary was fairly well stocked with horses, but Hungary was essentially a light horse country, and Austria never afforded much of a field for remount operations. Roumania, Bulgaria and Servia were all importing countries from Hungary, for army purposes. After the disrupture of Russia, Germany was able to arrange a limited number of animals from the Ukraine, but compared with other countries, Russian animals are small. Polish horses, for instance, are chiefly of the riding type. So that, taking all in all, the resources of the Central Powers were poor and limited. Ludendorff in his Memoirs bitterly laments this disability, and captured documents and orders during the war reveal a burning desire to capture some of the beautiful horses of the British for transport purposes. Germany was not enriched by animals of ours falling into her hands, which is a glorious page in the history of our animals in the war. And the imposing sight of the "grand" German Army in retreat with mixed teams of oxen and horses was a crown to her debacle.

On the other hand, the Allied Powers had the command of the best countries in the world for the supply of the most suitable animals for war purposes, the demand chiefly relating to those of the draught type. A brief review of remounting operations will illustrate the stupendous drain on the resources of various countries to meet the large wastage entailed.

The pre-war strength in horses of our Home Army was approximately 23,000. The strength in horses of the original Expeditionary Force which mobilized and went to France was 53,000. During the first twelve days of the War, 165,000 horses were impressed. Between August, 1914, and the middle of 1918 roughly 450,000 horses were bought in the United Kingdom. Over 700,000 horses and mules were bought in the United States and Canada on British account for various theatres of war. At one

*Presented at the meeting of Army Officers at the 68th Annual Meeting of the American Veterinary Medical Association, Kansas City, August 25-28, 1931.

period in France the British Expeditionary Force possessed roughly 475,000 animals of which 89,000 were mules. The total wastage from death, destruction, and missing in that theatre amounted to approximately 250,000 up to the end of December, 1918, and about 25,000 sold to agriculturists prior to disposals on demobilization. Roughly, therefore, during the four and a half years 750,000 animals took part in the war in France, including British, Indian, Canadian, Australian, New Zealand and Portuguese Troops. The demands for Mesopotamia, and to a considerable extent for Egypt, were met from India and Australia, remount operations from that side approximating 43,000 horses and 500 mules. East Africa was supplied from South Africa. At one period of the war, the strength of animals on all fronts totalled over 1,000,000, and the estimated number purchased throughout the war amounted to 1,361,000.

In August, 1914, 193,319 horses were on the strength of the French Army, while 799,661 were required. By November, 1917, 1,188,539 animals had been purchased in America and Spain to supply wastage in the French Armies. So great was the drain in France that on demobilization of our force, a large number of our horses and mules were purchased by agriculturists.

The United States Army when it mobilized required a large number of animals. In addition to those possessed by troops in France, there were at least 350,000 animals under training in depots in the United States in view of being sent to France.

Sickness and Wastage

From August, 1914, to 31st March, 1919, the total number of admissions and re-admissions of horses and mules to Veterinary Hospitals and Convalescent Horse Depots of the Home Commands and of the Expeditionary Forces in France, Egypt, Salonika, Mesopotamia, amounted to 2,526,549, of which 78%, or approximately 2,000,000 were cured and returned to duty. These figures of course represent admissions and not individual horses and mules, as it will be understood that animals were subject to several admissions during their career in the Army.

Animal inefficiency in war is not so much from battle casualties as from other causes. When large numbers are collected together in depots and camps, moved by rail and sea, and generally exposed to the vicissitudes of bad weather, respiratory sickness of an infectious nature is apt to prevail. During the first winter both at home and in France, before adequate provision of stabling and veterinary hospital accommodation could be made, respiratory sickness and mortality amongst our heavy draught horses ran very high.

Parasitic skin diseases such as lice and mange considerably augmented the number of admissions for treatment, particularly in the winter season when coats were heavy, and for which special dipping baths had to be constructed.

The most frequent and most serious form of inefficiency in the field was the exhaustion and debility induced by hard work, lack of water, and at times short rations. For instance, the Somme Offensive of 1916 left us with 16,074 debility (poor condition) cases, and with 195,000 animals engaged in the very arduous operations in front of Arras, when the strain of service was severe and the conditions of weather practically indescribable, exhaustion and debility admissions rose to the unprecedented number of 20,319 during the month of April, 1917, necessitating evacuation to those indispensable convalescent horse depots where they could have rest and be resuscitated with good food and a plentiful supply of water.

The old equine disease, viz.:—Glanders, which in previous campaigns occasioned considerable losses, gave comparatively little trouble during the late war, for the reason that the diagnostic substance mallein has the property of determining an infected case by a reaction long before it is dangerous. All animals were tested with mallein on first landing in the country of an Expeditionary Force, at a reception veterinary hospital on evacuation from the front, and again on discharge from hospital to a remount depot. By the expenditure of one million and a

half doses of mallein, the Expeditionary Force in France was assured freedom from the disease.

Certain infective diseases did, however occasion trouble. Epizootic lymphangitis, an ulcerative disease, introduced into the French Army by Algerian troops, made its appearance amongst our horses in September, 1917, resulting in over 200 cases, 80 of which were in a cavalry regiment, necessitating its withdrawal from the line into isolation. The seriousness of this disease lies in its insidious infectivity and long incubation period of 2½ months to 4 months, and our policy was eradication by destruction of affected and isolation of in-contacts up to the maximum period of incubation. Another ugly ulcerative disease associated at times with nephritis, was the ulcerative lymphangitis of Nocard. This is a mud-borne disease amenable to cure but liable to recur.

In winter of 1917-18 our horses at the front received a severe visitation of contagious stomatitis, a disease simulating the mouth symptoms of foot-and-mouth disease in cattle, and like that disease operating chiefly in cold weather. This troublesome complaint was introduced by remounts from America, where the disease was known to prevail, and it swept along the French and British fronts like wild fire. 2,596 cases were evacuated from our line for isolation treatment in veterinary hospitals, and to limit spread, units were forced to adopt a system of individual watering by means of small troughs improvised from worn-out ground sheets of the men. With the advent of the warmer spring weather this peculiar disease disappeared as mysteriously and as rapidly as it came.

A curious form of inefficiency in the B. E. F. France related to "picked-up nail," nails appearing to have a particular attraction for horses' feet. From the winter of 1915-16 onward, about 400 cases per week occurred. The nail from the wood burned in the "cooker" traveling along the road, and left on the ground in the building of huts, was ubiquitous.

Specific or periodic ophthalmia, resulting ultimately in disorganization of the eye and total blindness, prevailed most seriously and distressingly in France. Commencing in March, 1917, by the end of the campaign victims of this fell disease ran into thousands, some of our best draught horses being included. Blind horses could be worked in lines of communication units quite safely and satisfactorily, and on the principle of what the eye does not see, the heart does not grieve, they grew sleek and fat and invariably looked well. Indeed, a pair of blind wagon horses of a veterinary hospital took first prize at a horse show. The disease is the old "moon-blindness" of early coaching days, and though its etiology and pathology have yet to be definitely determined, it unquestionably is associated with insanitary surroundings. One can imagine the unhygienic state of locations for troops in northern France after four and a half years enforced occupation.

During the first two years of the campaign in France battle casualties in animals were extraordinarily low. With the advent of offensive operations of the summer of 1916, the enormous increase of artillery, and the development of bombs and gas, casualties correspondingly increased and loss became heavy. From the 1st July, 1916, to the 11th November, 1918, gas accounted for 211 killed and 2,220 incapacitated, gunshot and bombs, 58,090 killed and 77,410 wounded, or a total of 137,931 battle casualties in that theatre of war. An accurate record was kept of bomb casualties as against gunshot, from which it is possible to gauge the activity, strength and decline of the German air service. From such records, the zenith of German air power would appear to have been reached in August and September, 1917, when bomb casualties amounted to about 400 per week, and though the enemy left the front considerably alone and gave the back areas a dusting in May, 1918, the casualties week by week were on the wane, and in October, 1918, before the Armistice, they amounted to only about 16 per week.

Altogether there passed through veterinary hospitals and convalescent horse depots in France from the 18th August, 1914, to

the 22nd January, 1919, 725,216 animals. The percentage of cured up to the second year of the war amounted to 84%; it then came down to 82%, 80%, 78%, and gradually lower as the weakened resistance and recuperative powers of individual animals from the strain of service became more evident. These figures do not include minor ailments treated under unit arrangements at the front, which was usually 2% of strength, the working procedure being that animals requiring treatment for more than seven days were evacuated to veterinary hospitals on lines of communication.

In Egypt and Palestine up to the end of 1918, 447,757 horses, mules and donkeys, and 266,070 camels were treated for various ailments and injuries, of which 144,864 equines and 61,232 camels were sent to hospital.

The achievements of the mounted units of the Egyptian Expeditionary Force under Field-Marshal Viscount Allenby on the advance to Jerusalem in Palestine in 1917-18 is unparalleled in the history of a war of rapid and sustained movement, and is an honorable and glorious page in the record of service of animals performing work under the most trying conditions of privation. By force of circumstances and military exigency some horses of the units engaged went without water for as long as 84 hours, others for 77, 72, 68, 65, and 60 hours. Considerable exhaustion and wastage was experienced, but the supreme effort on the part of the animals of the force made victory possible. It is quite certain that no mechanical substitute could have filled the role so successfully borne by animal flesh and blood.

Veterinary Services

The foregoing brief recital of statistics showing animal reinforcements for the various expeditionary forces, and the sickness and wastage, will serve to indicate the enormous amount of work and responsibility which was placed on the Veterinary Service of the Army. We were quite prepared when mobilization for war took place. Out of the crudities of previous campaigns, and especially as a result of the appalling wastage of animals in the South African War, Army Veterinary Service had been organized on a self-contained corps basis, with means to meet rapid expansion consequent on the growth of an army and the general evolution of modern warfare. Indeed, such progress had been made that in the year before the war, the corps was drawn into staff exercises, and even a few months before the outbreak of hostilities, a veterinary staff exercise, complete with its administrative officers, veterinary officers in charge of field units, mobile veterinary sections, and veterinary hospital arrangements, was successfully carried out at Aldershot on a scheme arranged by the General Staff of the command.

The pre-war strength of the Army Veterinary Corps consisted of 169 regular officers (of whom 64 where in India and 32 in overseas colonies and Egypt), 19 reserve officers, 28 special reserve officers, and 322 warrant officers, non-commissioned officers and men. On mobilization of the original expeditionary force dispatched to France, the personnel of the corps to accompany it comprised 122 officers, administrative and executive, and 797 other ranks, the regular N. C. O.'s and men on the peace establishment having been augmented by the calling up of Army Veterinary Corps and class D cavalry reservists as horse attendants for hospital purposes.

By the end of the war, there had served with the corps in all theatres of operations, 1,668 officers (including special reserve, territorial force, temporary commissioned officers, and quartermasters) and 41,755 N. C. O.'s and men, of which the maximum strength at any given time was 27,950. In France alone, the total effective strength of the corps, including Canadian, Australian, and Indian personnel, rose to 765 officers, and 16,446 warrant officers, N. C. O.'s and men.

The veterinary units accompanying the force were 6 veterinary hospitals, each for 250 patients, 11 mobile veterinary sections for evacuation of sick and ineffective animals, and 2 base depots of veterinary stores. In a little over three years, veterinary hos-

pitals had increased to 20 with accommodation for 38,500 animals (18 hospitals at 2,000 patients each, and the Canadian and Australian hospitals at 1,250 patients each). Four convalescent horse depots with covered accommodation for 4,800 animals (1,200 animals each) were established, one of which was specially organized to take up to 4,000 animals at grass during the summer and autumn in the beautiful pasture lands round Gournay-en-Bray in Seine Inferiure, and the others with corrals on the liberty system, a very salutary expedient for the worn out and debilitated, and conserving in attendant personnel. Altogether, therefore, there was provided on lines of communication in France, covered accommodation for 43,300 sick and wounded animals with means for extension by pasture lands during summer. Records show that at one period of the war there were upwards of 45,000 animals under treatment in veterinary hospitals and convalescent horse depots.

Provision of veterinary hospital and convalescent depot accommodation presented many difficulties, especially at first. Distance of reception hospitals from the front line was an important factor, the long railway journeys of debilitated animals from the Marne and the Aisne fronts in the early days of the war resulting in a good many deaths en route. Convenience of hospitals at base ports for the respiratory sickness of the newly landed animals had to be thought of. It was possible to find excellent ready accommodation for both men and animals in the large brick factories of Northern France, and with reconstruction and addition these eventually ranked amongst our best hospitals. While making a reconnaissance in the Gournay district for the purpose of renting grass land in September, 1914, I found a circus owner stranded. Through the ordnance directorate, his horse tents and his large round circus tent were purchased. Other horse tents were ordered from the same maker in Paris, each holding a double row of 24 horses, or 48 in all, and were divided between hospitals at Abbeville, Rouen and Neufchatel (Pas de Calais) until more permanent stabling could be erected. The large circus tent was pitched in a convenient chalk pit at Abbeville, and afforded accommodation on an average for 160 animals constantly for nearly two years when Anno Domini tolled the knell of its demise. Other hospitals were constructed of iron fittings sent out from home and erected by the veterinary personnel, others again of wood with galvanized iron mangers and erected by local contractors with added prisoners of war labor, all constructional work being under the direction and supervision of the Directorate of Works, to which directorate and its officers a deep debt of gratitude and respect must be expressed for the comfort and well-being in every way of officers, men, and animals. Not the least important feature of stable construction was the provision of solid, sound, and hygienic flooring and approaches to the standings, for obviously it would be quite impossible to treat wounds and foot cases in mud and filth. Various expedients were adopted such as concrete or stone slabs, bricks on edge, beech planking, and four-and-a-half inch beech blocks set in tessellated form in chalk and cinders or sand. One hospital and two convalescent horse depots were erected in the sand dunes area to the south of Boulogne, and though special precautions were taken to avoid sand colic, the sand beds and corrals proved very restful for the exhausted and debilitated animals. As the

Extracting a piece of shrapnel from a shell wound

war progressed, and admissions to hospitals ranged between 2,500 and 3,500 per week (the highest number in one particular week being 4,512), hospital accommodation was first increased to 1,000, then to 1,250, afterwards to 1,500, and subsequently to 2,000 patients, the old unit of 250 being retained as a convenient sub-section of a hospital for working purposes. It was cheaper to add on accommodation to an existing hospital than to create new ones, and is was found just as easy to work a hospital for 2,000 patients as for a lesser number, to say nothing of facilitating the work of supply, railway and other services.

With the increase of the force as war progressed, the mobile veterinary sections which were attached to brigades of cavalry and to infantry divisions for the evacuation of their sick and ineffectives, mounted up to 77 in number, and to relieve these mobile sections of the necessity of being absent from their formations so much in the transport of sick by rail to veterinary hospitals at the bases or other points on lines of communication, veterinary evacuating stations (19 in number) were established at the headquarters of Corps, and special sick horse trains, complete with conducting parties and carefully devised feeding and watering arrangements, became the order of the day. Depots of veterinary stores were increased to five to admit of more convenient supply of remedies for both the units at the front and for hospitals, a bacteriological laboratory was established at the base, and seven installations termed "horse carcass economizers" were set up near groups of veterinary hospitals, whereby the by-products of hides, fat, bones, hair, hoofs, and desiccated flesh could be realized from animals which had died or were destroyed.

The provision of veterinary hospital accommodation would not be complete without reference to the great work achieved on behalf of animals by the Royal Society for the Prevention of Cruelty to Animals. This Society was constituted the voluntary aid organization to Army Veterinary Service, and spent nearly £200,000 in providing means for the material welfare of army animals. In France alone the society provided stabling for 12,500 animals, comprising 4 complete veterinary hospitals, the stabling for one convalescent horse depot, iron stabling for 1,000 horses at a base remount depot, and iron stabling for 250 horses at each of five other veterinary hospitals. Its munificent contributions did not end there, for it further provided 18 sets of corn crushers, chaff cutters, and petrol engines to work the same, 30 electric clipping machines, 107 horse tents, 4,000 manure skips, 100 manure trucks, 1,500 body sheets, and other stable and hospital necessities, including a ton of white paint for operating theatres. All the machinery necessary for the installation of the horse carcass economizer detachments at the seven centers were supplied by the society at a cost of £500 each, and for the veterinary units with field formations at the front it provided 80 horse-drawn ambulances or light floats with mobile veterinary sections, and 26 motor horse ambulances with veterinary evacuating stations at Army Corps Headquarters, the latter at a cost of £30,000. One cannot but admire, and be profoundly grateful for the fine spirit, the kind and sympathetic thought for animals in war by the good British people at home, who by their unfailing and more than generous response to the fund appeal of the R. S. P. C. A. lightened animal suffering, relieved much of the anxiety of those who had the care of animals in their hands, and enabled Army Veterinary Service very materially to apply scientific methods of treatment and advanced surgical procedure towards the mitigation of wastage and inefficiency of animals. It is fitting here to recall the words expressed by the Commander-in-Chief of the British Army in France (Field-Marshal Lord Haig) in connection with this special fund. He wrote "As you are aware, animals have been exposed to very severe trials and hardships, and have suffered not only as battle casualties but through the exhaustion and loss of health consequent on the severe stress of work. Their lot has, however, been greatly lightened, and their comfort in sickness materially added to, by the assistance which the fund had been able to give . . . I would specially like to express my thanks for the

provision of motor horse ambulances which have salvaged so many animals and proved indispensable adjuncts to the Veterinary Service, also of the veterinary hospitals complete with every known convenience for up-to-date surgical and medical treatment." No one was more solicitous for the welfare of the animals of the force than the Commander-in-Chief himself, and the same concern was ever present with general officers commanding formations in the field, and with officers commanding mounted units, but war is war, and its difficulties and its attendant circumstances had to be faced. When the troubles of the early days and the imperfections of a short establishment with inadequate means had been surmounted, and a radical change in organization more in keeping with the handling of large numbers of incapacitated animals effected, true efficiency of service became evident. A routine system was evolved which was the admiration of our allies, a copy for all time in suitability of organization and well ordered effort. Through its instrumentality inefficiency of animals at the front in France was kept at 12% in the harder times of winter and 7% in summer, and 3,000 animals per week on an average were discharged cured to the Remount Service for re-issue. Moreover, it is greatly to the credit of all ranks of the Army Veterinary Service that on demobilization and the return of over 62,000 animals to England, not a single case of contagious disease was introduced into that country, a true hallmark of efficiency in the scientific handling of disease. And the experience gained in surgery of all kinds in our large veterinary hospitals was of inestimable value to our young and skilled surgeons, to their profession, and to their country. The Royal designation to the Corps—now the Royal Army Veterinary Corps—was a fitting reward for meritable service cheerfully and efficiently rendered, and the honor is all the more a source of pride inasmuch as it was first notified to us in France by His Majesty the King, quite informally, on the occasion of a visit to one of our large veterinary hospitals.

Glanders, a plague of army animals of the 19th century and earlier was, by Mallein testing, held in complete control during the World War

In concluding this chapter, I should like to pay a personal tribute to all those who served in the Corps throughout the war, no matter in what theatre of operations they were engaged. The spirit of service was such that all grades of society and ages were to be found amongst the privates enrolled as horse attendants, all desiring to serve their country in the direction in which their ability or age befitted them, and none too proud to fulfill the role of a private in the Army Veterinary Corps. All honor and more power to them. Their reward is in the knowledge of duty well done.

Economy Effected

It has been said that Army Veterinary Service was one of the few services that during the war helped to pay for itself. This is quite true in part, for in the disposal of animals wasted during the war, and in the sale of animals on demobilization to agriculturalists and others, the Veterinary Directorate was constituted the disposal and accounting agency. Animals being creatures of mart, and valuable commodities, it will be apparent that large sums of money were involved. This item of economy is, of course, quite distinct from that accruing from the repair and making serviceable again those animals who have been rendered temporarily unfit for military service. A disposal of animals branch was, therefore, added to the Veterinary Directorate in France. All castings and disposals were

duly authorized, and accounts were audited by the financial adviser attached to G. H. Q.

Disposals were under three headings:

(a) Sale by auction to farmers and breeders.

(b) Sale for purposes of food.

(c) Dealt with in horse carcass economizers for by-products.

The following tables will show the numbers disposed of and the amounts realized both during the war and after the Armistice. In connection with disposal for purposes of food, it is necessary to explain that normally horse meat is eaten by certain classes of the community in France and Belgium, and moreover, when meat of any kind was scarce, sound horse and mule flesh was welcomed by the poor of Paris and other large towns. Care was also taken that no unwholesome flesh or diseased animals were submitted for sale.

TABLE A

(From the inception of the Disposals of Animals Branch up to cessation of hostilities.)

DETAIL	Number of animals	Approx. amount realized	Average price
Sold to farmers and breeders..	7,775	£168,868	
Sold to Paris horse butchers..	28,384	£364,438	£12 16 0
Sold to local horse butchers...	16,578	£231,621	£14 0 0
Dealt with by butchery detachments and issued to labour companies and prisoners of war.....	4,536	£65,206	£20 0 0
Dealt with in horse Carcass economizers for by-products.	7,061	£28,244	£4 0 0
	64,344	£858,377	

TABLE B

(From Armistice, 11th Nov., 1918, and on demobilization up to 31st March, 1919.)

DETAIL	Number of animals	Approx. amount realized	Average price
Sold to farmers and breeders..	112,132	£3,778,907	
Sold to Paris horse butchers..	8,664	£160,474	£18 10 0
Sold to local horse butchers..	20,679	£414,919	£20 0 0
Dealt with by butchery detachments for labour companies and prisoners of war	3,903	£76,665	£20 0 0
Dealt with in horse Carcass economizers for by-products	6,699	£26,796	£4 0 0
	152,077	£4,457,761	

The total amount realized in France, Belgium and the Rhine Provinces in the disposal of animals for food up to the end of March, 1919, reached the colossal sum of £1,313,323, and in the disposal of carcasses at the seven locations of Horse carcass economizers, the sum of £55,040 was credited to the public. Sales continued after the 30th of March and the total amount realized by Remount and Veterinary Services from the cessation of hostilities, 11th of November, 1918, up to 5th of July, 1919, reached the sum of Frs. 190,840,634, or £7,340,000 at the rate of exchange prevailing then. Sales by private treaty and selection by municipalities and farmers' associations were arranged through Prefects as well as sales by auction. About 25,000 of the best horses were retained for the Post-bellum Army and the Army of the Rhine, 62,000 approximately were repatriated to England, and the balance sold in France and Belgium.

An interesting item of economy lay in respect to manure and the offals of animals which had died or were destroyed. It will be realized that in large veterinary hospitals and remount depots the output manure at 32 lbs. per horse per day is enormous, and constitutes a difficulty in disposal. In certain locations convenient chalk or clay pits formed excellent places for manure dumps, and if the offals of deal animals were buried in the manure, there generated a methane gas, particularly under conditions of wet. This could be collected by means of a barrel or other receptacle chamber, conducted by pipe a few yards away or a safe distance to avoid explosion, and supplied by means of improvised bunsen burners to galvanized iron tanks for cooking horse food or boiling bones for fat. Another economy and a welcome addition to the men's diet was the growing of vegetables in the precincts of the hospitals, and prolific crops resulted. One hospital produced a potato 2 lbs. 4 ozs. in weight, another hospital a vegetable marrow 62 lbs. in weight, and yet another hospital a parsnip 3 ft. long. Schemes were on foot for extending this beneficial pursuit, and had the war in France been further prolonged it was contemplated growing green crops for the sick animals. Out of the 630 N. C. O.'s and men of a large veterinary hospital, and most of them 41 years and upwards, men could be found to do almost anything, from boot-repairing or carpentry to haircutting, gardening and farming. Veterinary hospitals were unique as working entities.

FRENCH WOMEN VETERINARY SURGEONS

France has long known veterinary surgeons of the gentler sex. These workers have flourished in remote agricultural districts for over a century, and no doubt a hundred years hence they still will be part and parcel of rural life. It must, however, be pointed out that not all practitioners have qualified in the manner prescribed by the government. Indeed, a percentage of them have never even dreamed of facing an examination, which perhaps is just as well, since they read and write but indifferently. Yes, these people have no hesitancy in performing simple operations on the horses, flocks and herds of the countryside.

If Marie, Zélic and Thérèse know neither text-book nor diagram, they at least have attended the school of practical experience. Certainly, the qualified veterinarian may be called in for an important operation; but in ordniary cases, a woman relies upon her own resources. Marie and her colleages rarely make a botch of things; they realize their own limitations.

There are numerous duly certified women veterinarians who have gone through the curriculum at some veterinary college and passed the final examinations. Two of them hold government appointments in the French Colonies, while others receive their monthly emoluments in France. As, however, minor official jobs usually are illy remunerated, "les dames vétérinaires" seldom hanker after patronage of this nature. Independent practice is much preferred, and it does not take long to build up.

One of "les dames vétérinaires"

An "Entente"

Upon women first entering themselves at veterinary colleges elderly practitioners of the sterner sex objected to their presence in these abodes of learning. The malcontents argued that man alone should wield the surgical knife, that a woman's nerve might not be equal to the strain, that it would fail at the critical moment. Happily, the professors were less ungallant, while the male students welcomed learners of the more decorative sex. Good comradeship prevailed, the lads rejoicing when the lasses passed high up on the list. Indeed, at a recent examination, the highest number of marks fell to a young girl of twenty, her application during a three-year course having been exemplary. Another fair student took fourth place.

There is no little competition between the qualified women veterinary surgeons and those who have "picked up" their knowledge without attending classes of any description. The former live in a certain style, and, to enable them to make ends meet, demand fees which are more than some farmers care to pay. Marie, Zélic and Thérèse, keeping well below this figure, obtain much of the business and to their joy. But the college-bred woman veterinarian or other legally qualified practitioner must be called in on important occasions.

Geo. Cecil.

Paris, France.

NEW DRUG AIDS CAMPAIGN ON WORM PARASITES OF HORSES

A new drug treatment discovered by scientists of the Bureau of Animal Industry, U. S. Department of Agriculture, promises to aid the campaigns of several States to control internal parasites of horses. The drug, normal butylidene chloride, is highly effective for the removal of red worms or bloodsucking strongyles and for small strongyles. It is also effective against large intestinal roundworms and certain stomach worms and pinworms.

DYNAMITE POISONING IN ANIMALS

How much dynamite will be needed to poison a horse weighing 1400 lbs? What lesions could be found at the post mortem? —L. M. G., Quebec.

Reply: Having had but little experience with poisoning by dynamite, I did not attempt to answer your question until I had sought information from what I regarded as the most reliable authorities.

On a few occasions I have been consulted in the case of sudden and mysterious deaths in cattle and was able to trace it rather definitely to the cattle having eaten the wrappings from dynamite sticks, but personally I have never seen a case of death in the horse that had been associated with poisoning by dynamite.

I wrote the Pathological Division of the U. S. Bureau of Animal Industry, Department of Agriculture, Washington, D. C., and received the following reply:

This Bureau has received reports of the loss of livestock from dynamite poisoning, but has not had an opportunity to observe any cases. Statements in the literature indicate that symptoms in animals are similar to those in human cases of nitro-glycerin poisoning, which include nausea, vomiting, colic, sometimes blindness and delirium. The nitrates cause a decided fall in blood pressure and induce the formation of methemoglobinemia without, however, any destruction of the erythrocytes so that the chances of recovery are great. In human cases the best treatment is strong coffee. Death occurs by respiratory failure and the postmortem picture should be that of asphyxiation probably complicated with the characteristic browning of the tissues due to methemoglobin. Dossin, *Arch. Intern. Pharmacol,* 21, 425, 1911, discusses the effects of nitrates on animals.

I also wrote E. I. DuPont De Nemours & Company of Wilmington, Delaware, and received from the Manager, Technical Division, the following reply:

Regarding the toxic properties of dynamite: The nitroglycerin therein contained is an exceedingly quick poison. Some experiments that I have made on rats showed it to be very much quicker in its action than either arsenic, strychnine or potassium cyanide. In fact, two drops of nitroglycerin put in a rat's mouth caused his death in ten seconds.

Dynamite contains anywhere from 10 to 60% nitroglycerin. If a horse ate a whole cartridge of about half a pound of dynamite, he would almost certainly die. I do not believe that any lesions would be found, although I regret to say that I neglected to autopsy the rat.

The action of nitroglycerin, of course, is to stimulate the vasomotor nerves, causing dilation of the arterioles and capillaries which increase the heart action to such an extent that a horse with a weak heart would probably die.

Of course, all this leaves the question very much unsettled but as a result of the publication of this correspondence some real information should be brought out from others who have had experience. Let us have it.—J. F. D.

PROTOZOAN KILLS WILD DUCKS

The number of wild ducks, greatly reduced by various adverse conditions, are being still further decreased by a disease caused by a little one-celled organism, a protozoan known as *Leucocytozoon anatis* Wickware, according to a report received by the Bureau of Biological Survey, U. S. Department of Agriculture, from Dr. Earl C. O'Roke of the School of Forestry and Conservation of the University of Michigan. Doctor O'Roke has just completed his second summer's study of this disease at the University Biological Station, Douglas Lake, and elsewhere in Michigan.

This organism has a complicated life cycle. In certain stages it occurs in the red blood cells, and in others in tissue cells of glandular organs. The parasite is transmitted from duck to duck by the bites of black flies or buffalo gnats. Adult ducks harboring the parasites are apparently little affected by them, but ducklings succumb in large numbers. Death of the duckling may occur at the time of the first appearance of symptoms, but usually it does not take place until the twelfth day after exposure.

The blood of a sick duckling is thin, pale, and watery, and contains numerous spindle-shaped parasites somewhat larger than normal blood cells. The most common lesion at autopsy is the greatly enlarged, blackened spleen.

PRESERVE THE STATE VETERINARY EXAMINING BOARD

I have read the opinions of four practitioners in recent issues of VETERINARY MEDICINE on the subject of granting veterinarians licenses to practice in the various states without requiring the usual state board examination. It seems to be the opinion of these practitioners that the bars should be absolutely thrown down to anyone holding a diploma from a recognized veterinary college, and he should be accepted into the fold as a qualified practitioner.

I cannot concur in this view. I heartily believe in reciprocity in the matter of licenses under proper restrictions. Before a man should be granted a license to practice in any state he should be required to prove that he is thoroughly qualified. The possession of a diploma unfortunately or otherwise does not prove that he is so qualified. A man may have graduated from one of the best schools in the world and if for any reason he abandoned the business his diploma certified his fitness for, even for a short period, he is no longer qualified. I have a case in mind that will illustrate my point exactly and at the same time will show the unjust injury such a practice might do a real practitioner.

A man graduated some thirty or more years ago. He entered the B. A. I. as an inspector for a period, later accepting a position in a clerical capacity with a large corporation. This was twenty-seven years ago, since which time he has in no way kept in touch with veterinary medicine. A few years ago he lost his position with the corporation. He then tried a couple of ventures without success. Less than a year ago the city in which he lives was to appoint a meat inspector, who must be a licensed veterinarian. This position had been held by a veterinarian who had continuously practiced his profession there for more than thirty years. Through political chicanery this man was given the appointment, though unlicensed.

Would you say that this man was entitled to this position? Would you say that he is a qualified veterinarian after a lapse in business for a period of twenty-seven years merely because he has a diploma? Is it fair that such a man should be placed in a position to take business from a veterinarian who has clung to his chosen calling for a lifetime? New things in the veterinary field are developing so rapidly that the man who is a graduate of yesterday is not qualified unless he is a student of present day development, methods and technique, and in active practice.

Yes, I favor reciprocity but I say maintain the examining board. The applicant should be required to present his diploma and a statement of his business activities in so far as it concerns his career as a veterinarian since graduation. The board should investigate his claims and then grant the license with or without examination as the facts justify.

Let us have reciprocity in appropriate cases, but in any case issue licenses on qualification and merit only.—E. J. F.

DIARRHEA IN CANINE DISTEMPER

In cases of the intestinal form of canine distemper where the diarrhea is persistent, I have had good results from the use of 10 to 20cc doses of anti-calf scour serum. Usually not more than two doses given with an interval of 12 to 24 hours between them, are required to stop the diarrhea. The serum should be given subcutaneously and not more than 5cc at one place. Of course, the usual aseptic precautions should be taken.

A. W. Miller.

Harrisonburg, Va.

SWINE SANITATION INCREASES PROFITS

An increase in gross returns, amounting to $45 per sow, is credited to the swine sanitation system by A. J. Long, an Indiana farmer, who in reporting to U. S. Department of Agriculture compares his 1931 pig crop with his 1930 production. In 1930, under the old system of management, Mr. Long's 20 sows raised a fraction less than five pigs each. The pigs required eight months of feeding to fatten them to a market weight of 200 pounds. This year the

same sows, managed under the system of swine sanitation, raised 159 pigs, or an average of nearly 8 pigs per sow. At the age of five months and 12 days, 32 of this year's pigs were marketed and averaged 201 pounds. This was not only an increased production per sow, but there was a saving of more than two months' feed in finishing the pigs for market.

CONTROL OF LIVER FLUKE

Effective methods have recently been developed for eradicating liver flukes from animals and for destroying the snails which live in or near water and are responsible for the spread of liver flukes.

Liver flukes are especially injurious to sheep and goats but also affect cattle. The liver fluke is flat, leaf shaped, and pale brown in color. The flukes live in the bile ducts of the liver, usually remaining there from 9 to 12 months. Each fluke produces about 100,000 eggs which pass out in the manure of infested animals. Under favorable conditions of temperature and moisture the eggs hatch and the microscopic embryos, known as miracidia, leave the eggs and swim about in pools, streams, or other bodies of water. Unless the embryo finds a suitable snail host it lives only a short time—from one to three hours. Once within the snail, the embryo comes to rest near the lungs of the snail, where two stages of the fluke develop. The time required for this development varies from 49 to 80 days.

The immature fluke leaves the snail as a free-swimming cercaria, which is the fourth or tailed stage of its larval life. It wiggles about in water and ordinarily attaches itself to some object such as a blade of grass or a leaf and forms a cyst. When cercariæ on grass or in water are swallowed by animals, such as sheep, goats, or cattle, they enter the digestive tract where the cysts are dissolved, liberating the young fluke. It then bores through the walls of the intestines into the body cavity where it wanders about and finally reaches the liver which it penetrates. It finally reaches the bile ducts, where it matures. The time required for the completion of the life cycle from egg to egg is about six months. Flukes reduce the vitality of animals and sometimes kill them, and also cause the liver and body tissues to be unfit for food. In some places all of the sheep grazing on fluke-infested pastures have succumbed to the ravages of this parasite.

CONTROL OF HEMORRHAGE AFTER DEHORNING

We have just read the article, "Dehorning," by Doctor Ferguson, in the December, 1931 issue of VETERINARY MEDICINE, and note that he uses and recommends "wooden pegs or matches driven solidly into the horn foramina to stop the profuse post-operative hemorrhage."

Some years ago we were reminded (Sisson) that blood supply of the horn is chiefly from a branch of the superficial temporal artery which passes around the outer side of the base of the horn-core, supplies the matrix of the horn, and anastomoses across the back of the frontal eminence with the artery of the opposite side. With these facts in mind we were able to control all hemorrhage by the simple trick of passing double binder twine or fodder twine about the horn bases, rather low, to exert adequate pressure on the arteries, tying firmly either forward or back of the frontal eminence. To increase this pressure the strings, forward and back of the frontal eminence may be brought closer together by passing other strings beneath them—about three inches from the horns—and thus take up all slack by tying up over the frontal eminence. If this pressure is properly placed before, or after, using the dehorning shears there is no appreciable hemorrhage. The pressure strings will not be cut in the operation even though an inch of the haired skin is removed with the horn as it should be.

After two hours the owner cuts these pressure strings with shears. Why the shears? Because he is less likely to cut himself.

F. R. Wadsworth.

Lindsey, Ohio.

STRANGULATED HERNIA IN A STALLION

Early one morning, I was called to the fair grounds to treat an aged, but valuable racing stallion. He had been jogged on the track and came in exhibiting colicy symptoms, pawing, stretching, lying down and rolling on his back, with his feet against the side of the box.

I suspected a strangulated hernia, and noted that one side of the scrotum was enlarged. The horse had very large heavy testicles, and jogging had dragged the small intestine or the omentum into the inguinal canal.

Frequently I castrate ruptured pigs by doing the so-called covered operation after forcing the intestine back into the abdominal cavity by merely twisting the testicle until the hernia is reduced, then tying it and removing the testicle in the ordinary manner of the covered operation.

When this stallion was cast and prepared for operation, I decided to try this method of reducing the hernia, and twisted the testicle in the side of the scrotum that was enlarged. To my surprise, the horse was immediately relieved and no cutting or other treatment was required. There has been no recurrence of the condition since.—W. V. P., New York.

THE TREATMENT OF OPEN JOINT

While at college in 1906, M. Dauvois was instructed by Professor Cadiot to treat an open fetlock joint of a light cart-horse by injecting the fistula with oil and biniodide of mercury. Finding difficulty in introducing the mixture through the point discharging synovia, with a Pravaz needle, he punctured the posterior cul de sac of the synovial membrane between the metacarpus and the suspensory ligament and readily injected the joint, some of the oil escaping by the fistula. The escape of synovia stopped, but as a result of the irritation there was pseudo-anchylosis and the patient left the college permanently lame. Being equally unsuccessful afterwards in several similar cases with injection of various antiseptics, he abandoned this method. In July, 1929, having a case of open fetlock joint, he injected five drams of lacto-serum (whey) into the posterior cul de sac of the joint synovial membrane. A rapid cure resulted and eight days later the animal was put to work. He himself and several of his confreres have had like happy experiences.

Another case is reported in which a harrow-pin, entering the back of the pastern, perforated the flexor tendon and entered the sesamoidean sheath. The joint was not involved. Puncturing the tense synovial sac in front of the perforans, ten drams of lacto-serum was injected through the Pravaz needle, some of the liquid escaping by the wound below. Next day an ounce of lacto-serum was injected and now none escaped by the wound and a perfect recovery resulted.

The author advises that the injection be made away from the wound as soon as possible after the injury is inflicted and repeated next day if necessary.—*Recueil de Médecine Vétérinaire,* Vol. cvii, No. 9. Abst. in the *Veterinary Record,* Vol. XI, No. 47.

CAN BR. ABORTUS BE TRANSMITTED FROM MAN TO CATTLE*

Tracing the source of Bang infection in a herd in Sweden,[31] repeatedly tested and found clean, every possible animal transmission, direct or indirect, seemed to have been eliminated. Finally it was found that one of the recently hired woman milkers had had undulant fever six months previous to her employment. At the time of investigation her blood still showed an agglutination-titre of 1:100.

Dr. Martin Kristenson, State Serum Institute, Copenhagen, was then approached with the question: "Is it possible for the herd to be infected by this milker?" His opinion was that there was a possibility of transmission from man to animal, but that such a case had never been reported from Denmark.

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* Hultén, O. Undulant Fever in Man—Can It Be Transmitted to Cattle? *Svensk Veterinartidskrift* 36 (1931): 208-213. Abstracted by O. Norling-Christensen, '32, O. S. U., Columbus, Ohio.

Reviews and Abstracts

By FRITZ VOLKMAR, Columbus, Ohio

Modified Bipp Treatment for Fistulous Wounds

The authors[1] report excellent results with a modification of the Bipp-method as follows: Three formulas for pastes are used.

Paste No. 1: Ichthyoli 12.0; Lanolin 20.0; Cerae flavae 15.0; Adep. suill q.s. 100.0.

Paste No. 2: Thymoli, Montholi aa. 1.0; Paraffini 20.0; Cerae flavae 15.0; Vaselini q.s. 100.00.

Paste No. 3: Thymoli, Mentholi aa. 1.0; Balsam. Peruv. 2.5 (in spirit. vini rectif. 10.0); Paraffini 20.0; Cerae flavae 15.0; Vaselini q.s. 100.0.

The paste is cooled to about 50° C. (122° F.) and injected into the wound with a sterile metal syringe having a long canula. Necrotic particles are removed from the wound by curetting. Bleeding is controlled with dry tampons. Under no conditions are irrigations allowed. Previous to repetition of the treatment, the amount of paste remaining in the wound is gently pressed out without touching the wound.

Sugar Content of Blood of Cattle

Glycolysis of blood is influenced by temperature, the kind of anticoagulent added and the treatment to which the blood is subjected following bleeding. Therefore it has been practically impossible to analyze blood samples sent in from practitioners.. The authors have found that by the addition of sodium fluoride 0.2-1% and packing the cooled tubes in thermos bottles filled with ice or ice water, or water not above 13° C., such blood will keep its sugar content constant and unaltered for at least three days. Following are determinations of bloodsugar of five clinically healthy Holstein cattle, 1½ to 8 years old, bled shortly after the morning feeding: 10 animals 52 to 59 mgm per 100cc; 25 animals 60 to 69 mgm; 12 animals 70 to 79 mgm, and 4 animals 80 to 87 mgm per 100 cc.

Virus Destroying Properties of Lye

Lye[3] possesses to an exceptional degree the property of destroying hog-cholera virus. The rapidity of destruction depends on the medium in which the virus occurs. In albuminous-free fluids (urine), a 2% lye solution will kill the hog-cholera virus in 15 minutes. In albuminous fluids (blood), destruction is not accomplished until after two hours contact.

Diagnosis of Tuberculosis of Dogs

The diagnosis of tuberculosis in dogs may be made intra-vitam by the serological examination of the hydrothoracical fluid and affirmed by cultural experiment.[4] Ascites fluid or blood are not always suitable for this examination. For the differentiation of the types, Petragnani's medium is practical. The tuberculous dog is a menace to its human associates.

The Urine of Dogs

In the morning urine of dogs with skin diseases[5] the calculated value for the decrease of the freeizng point lies between 0.82 and 3.235. In nearly all cases the specific gravity parallels the freezing point. Albumose, a pathological product of excretion decreases the surface tension much more in cases of primary low specific gravity than in high specific gravity. Hemoglobin, present to 0.5% in urines with primary paucity of albumen, and in urine rich with albumen, increases the Graham value considerably. Albumoses and hemoglobin do not always increase the viscosity of concentrated urines

[1] Marsalsky, K. L. and Nemidenko, I. J. The Treatment of Purulent and Putrid Wounds. *Tierärztl. Rundschau* 37 (1931):327-330.

[2] Liess and Luy. Conservation of Bovine Blood for the Determination of Its Sugar Content. *Berl. Tierärzl. Wchnschr.* 47 (1931):4-6.

[3] David, W. Disinfection with Solution of Caustic Soda (lye) in Outbreaks of Hog Cholera. *Berl. Tierärztl. Wchnschr.* 47 (1931):209-214.

[4] Dahmen, H. and Bernard, M. Type Differentiation of Tuberculosis of Dogs and Other Animals. *Tierärztl. Rundschau* 37 (1931):377-379.

[5] Graf, H. Physico-chemical Urinanalysis in Dogs with Special Reference to Skin Diseases. *Tierärztl. Rundschau* 37 (1931):109-113; 214-216 and 365-367.

proportionally. The viscosity increases proportionally with the sugar content; the surface tension changes little. Acetone diminishes the specific gravity but increases considerably the viscosity and surface activity. In the mixture of acetone and sugar, the acetone arrests the increase of density from sugar; the viscosity is larger than in either one singly. The surface activity of acetone is pronounced. By primary initially high density of urine, the influence of acetone upon the density is minimal. In the morning urine of low or medium high specific gravity and normal chemical and cytological findings, the stalagmometrical quotient is 40 to 80, and the acidity quotient is 108 to 239. Compared to the normal urine of man, no essential difference exists. In albuminous urines with cellular sediments an increase in both quotients was recognizable, which was likewise found in human urine. The viscosity quotient of the urine without abnormal finding was 0.99 to 1.01.

Treatment of Dourine

Naganol in doses of 0.01gm per kgm body weight injected into a horse, experimentally infected with dourine,[6] gave a transitory therapeutic effect. The horse recidivated after 40 days and died after additional 14 days from dourine. Tartarus stibiatus, in a dose of 0.005gm per kgm body weight, injected intravenously into an experimentally infected horse, gave a similar transitory result as with naganol. The horse recidivated after 35 days and died after 19 additional days from dourine. Two experimentally infected horses were given both drugs at 24 hour intervals. No recidivation occurred during seven months of observation. No trypanosomes could be demonstrated. It is concluded that the combination of naganol with tartarus stibiatus offers an efficient method for combating dourine.

Liver Pulp Treatment Worthwhile in Anemia

The favorable results of American authors with raw liver diet in cases of human pernicious anemia prompted the author[7] to experiment with this treatment in anemia of horses. The liver pulp was prepared from fresh horse, calf, cattle or pig liver. The livers were very finely ground in a meat grinder and water or physiological salt solution was added. The diluted pulp was then injected directly into the stomach with a stomach tube. The horses were found to tolerate large amounts of it.

The results of the experiments may be summarized as follows: Secondary anemias, of toxic-infectious origin, heal as a rule completely without treatment, provided that the primary cause disappears and no damage to the erythropoietic apparatus has resulted. When injury to the blood forming system is present, that is an increased degeneration of blood cells and inadequate new formation of red cells, neither the specific treatment with liver pulp nor its combination with reduced iron will bring permanent recovery. Depending upon the degree of injury, an improvement may be expected in some cases, but no complete recovery. It is known that in equine anemias the bone marrow is frequently in a condition of extreme insufficiency and therefore aregenerative, a fact which precludes permanent therapeutic results in the sense of an increase of erythrocytes and of preserving these values.

Peptic Ulcer in Cattle

The initial stage of peptic ulcer[8] has very few characteristic symptoms. As soon as the erosion causes stomach bleeding, a definite diagnosis may be arrived at. In most cases the typical symptoms are: inappetence, inhibition of rumination, slight colic-like pains, tympanitis, fall of body temperature with increase in pulse frequency, paleness of the visible mucous membranes, coolness of the horns, ears and extremities, paresis of the paunch, delayed defecation of blackish, tar-like, slimy and ill-smelling feces in small amounts, muscle tremor, general debility and symptoms of internal bleeding.

[6] Gurwitch, B. M. and Subotnik, A. S. Experimental Investigation of a Combination of Tartarus Stibiatus and Naganol for the Treatment of Dourine (of Horses). *Tierärztl. Rundschau* 37 (1931):379-381.

[7] Krupski, A. Treatment of Equine Anemias with Liver Pulp. *Schweiz. Arch. f. Tierheilk.* 73 (1931):122-128.

[8] Müller, F. Ulcus Pepticum in Grown Cattle. *Schweiz. Arch. f. Tierheilk.* 73 (1931):70-82; 132-159.

Hematemesis as reported by some authors, has not been observed.

Prognosis is doubtful in all cases. Of the 12 cases reported, emergency slaughtering had to be performed in eight; four recovered. Early competent treatment will be of value. The treatment consists of rest, closely restricted diet, cold water compresses around the abdomen; application of opiates, mucilages, bismuth, silver nitrate, gelatine, caffeine, white wine. For after treatment, chlorcalcium and saline solution are recommended.

Origin of Fish Odors

In 14 experiments and numerous other investigations of fishy odors,[9] a purely autolytical decomposition could not be observed. The most frequent and practically most important decomposition of fish flesh is caused by water bacteria. Through sterilization (searing with a flame) of the gills and skin —thus destroying the ever present water bacteria—the flesh and the entire fish could be kept fresh much longer. For instance the muscle flesh of a tench could be preserved fresh for 17 days and the one of a flounder for eight days in an ice box, without developing any bad odors or other changes.

Diagnosis of Leucemia in Chickens

Through extirpation of liver pieces it was possible to make the diagnosis fowl-leucemia intra vitam[10] in a large number of suspected chickens. In the left lower abdominal region, between the backward extended left femur and the posterior end of the sternum, the feathers were plucked and the skin disinfected. In the triangle formed by the lateral branch of the sternum, last sternal rib and the femur, an incision is made through the skin, abdominal muscle and peritoneum. If the inspection of the liver through the expanded wound arouses suspicion, a section of the liver is pulled through the wound and a small piece cut off for histological examination.

Agglutination Reactions in Pullorum Disease

The following conclusions are drawn:[11] the simplified agglutination test is of equal value with the tube test for the detection of carriers of pullorum disease. For positive reactions the simplified method is more sensitive (see also Bunyea and Hall, 1931: Studies in the Transmission and Control of Pullorum Disease) than the tube test. Blood of doubtfully reacting hens should in all cases be retested by the tube method. Roosters should always be tested by the tube method because the simplified test seems to be less suited to their examination.

The simplified test, in combination with the tube test for doubtful cases, is recommended as very economical. When the percentage of reacting hens is rather high and the hens are of high egg-laying capacity, these hens may be segregated in separate flocks under quarantine regulations.

Treatment of Osteomalacia in Cattle

Osteomalacia may be recognized by a change of the phosphorus and calcium content of the blood serum. Latent cases may be thus detected. In the cases under consideration by the authors,[12] the phosphorus content was greatly diminished, while the calcium content was decreased but little or not at all. Vigantol (viosterol) has given excellent results in treatment of osteomalacia, especially when combined with feeding of clover and alfalfa hay. Vigantol is best applied intravenously in doses of 3cc at five to seven-day intervals. Intramuscular injections also gave satisfactory results. Subcutaneous and oral administration was less reliable.

[9] Schoenberg, F. Does Autolytical Decomposition of Fish Flesh Exist? *Berl. Tierärztl. Wchnschr.* 47 (1931) :65-69.

[10] Bornsteadt, S., and Rohrer, H. The Diagnosis of Leukemia in Fowl. *Berl. Tierärztl. Wchnschr.* 47 (1931) :81-83.

[11] Schmid, G. A. Comparison of the Results of the Tube Agglutination Test and the Simplified Agglutination Test for the Diagnosis and Prevention of Pullorum Disease. *Schweiz. Arch. f. Tierheilk.* 73 (1931) :163-173.

[12] Schermer, S. and Hofferber, O. The Phosphorus and Calcium Content of Bovine Serum in Osteomalacia and the Curative Action of Vigantol. *Berl. Tierärztl. Wchnschr.* 47 (1931) :97-100.

Ovarian Cysts and Sterility

The etiology of the avarian cysts is not uniform. In different animals and under various circumstances, different causes may be found. Through the investigations of other research workers (see Jour. Am. Med. Assoc. 96:2176: Anterior Pituitary Hormone in Urine), as well as through the experiments of the authors,[13] a dysfunction of the anterior lobe of the hypophysis has come under discussion as a new etiological factor in the cystic degeneration of the follicles.

The authors are of the opinion that the cysts in the ovaries may be occasioned by incapacity, especially atrophy, that is, inability to receive anterior lobe hormone, causing the other ovary to become flooded. With the atrophy or absence of one ovary it follows that the other one of necessity would become cystic. As a matter of fact, quite frequently one ovary is found diminished and the other cystic.

For therapeutical procedure the following prospects are opened up: in case of non-appearance of sexual maturity, anterior lobe substance may be injected, which will activate the ovary, provided it is normal. Likewise the failure of complete ripening of the follicle and the non-appearance of ovulation by approaching estrum or in the event of estrum could be avoided by such a preparation, that is, ovulation could be produced.

Favorable results are to be expected also in cases of presenile inactivity (anaphrodisia), if ovary implantation is not preferred. Following is a protocol of anterior-lobe-extract therapy in cattle: 38 cows with lack of estrum received subcutaneously 2 to 3gm bovine anterior (ground with physiological salt solution and phenolized to 0.5%). The treatment was successful in 31 cases, failure resulted in seven cases; of the latter, two had peritoneal adhesions of the salphinx.

[13] Frei, Wand and Gruter, F. Etiology of Ovarian Cysts. *Schweiz. Arch. f. Tierheilk.* 73 (1931):219-225.

Advantages of "Helminthological Total Autopsy"

The author[14] had occasion to analyze worm material from the colon of a two-year-old stallion at the helminthological division of the Soviet Russian State Institute for experimental veterinary medicine. By the method of the so-called "helminthological total autopsy" elaborated by Skrjabin and employed now by the disciples of Skrjabin's school, 32,900 worms were recovered from the contents and mucosa of the colon of this stallion. They belonged to five genera and 27 species. The genus *Strongylus* (Müller 1780) was present with 78 specimens. Following is the number of males and females: *S. equinus* (Müller 1780) 2 m., 2 f., *S. edentatus* (Looss 1900) 38 m., 31 f., *S. vuglaris* (Looss 1900) 2 m., 3 f. Of the genus *Triodontophorus* 218 specimens were presen: *Tr. serratus* (Looss 1900) 62 m., 65 f., *Tr. brevicauda* (Boulenger 1916) 38 m., 31 f., *Tr. tenuicollis* (Boulenger 1916) 8 m., 6f. The genus *Craterostomum* (Boulenger 1920) contained one male specimen belonging to *C. mucronatum* (Ihle 1920). The genus *Gyalocephalum* (Looss 1900) contained 57 specimens belonging to *G. capitatus* (Looss 1900) 31 m., 26 f. The genus *Trichonema* was the most numerous with 31,206 specimens belonging to 19 species: *Tr. longibursatum* (York and Macfie 1918) 5,043 m., 7,116 f., *Tr. catinatum* (Looss 1900) 1,337 m., 2,372 f., *Tr. nassatum* var. parvum (York and Macfie 1918,) 1,793 m., 1,875 f., *Tr. calicatum* (Looss 1900) 1,097 m., 1,957 f., *Tr. pateratum* (York and Macfie 1919) 702 m., 1,116 f., *Tr. insigne* (Boulenger 1917) 715 m., 1,082 f., *Tr. minutum* (York and Macfie 1918) 617 m., 936 f., *Tr. leptostomum* (Kotlani 1920) 434 m., 691 f., *Tr. labiatum* (Looss 1902) 299 m., 502 f., *Tr. goldi* (Boulenger 1917) 256 m., 532 f., *Tr. radiatum* (Looss 1900) 70 m., 185 f., *Tr. coronatum* (Looss 1900) 68 m., 117 f., *Tr. hybridum* (Kotlani 1920) 53 m., 79 f., *Tr. bicoronatum* (Looss 1900) 26 m., 57 f., *Tr. elongatum* var. Kotlani (Ihle 1920) 30 m., 34 f., *Tr. poculatum* (Looss

[14] Bederke, O. Qualitative and Quantitative Analysis of the Helminth Fauna of the Equine Colon. *Berl. Tierärztl. Wchnschr.* 47 (1931):149-150.

1900) 15 m., 29 f., *Tr. cuproctus* (Boulenger 1917) 4 m., 6 f., *Tr. triramosum* (York and Macfie 1920) 1 m., 2 f., *Tr. brevicapsulatum* (Ihle 1920) 1 m., 2 f. There were in addition 422 Strongylus larvae. Specimens of two genera had not been identified yet and a number could not be identified due to deformation. While the females were found in greater number than the males, no correlation could be established. Another instance is cited where the cecum and colon of a Siberian horse harbored 52,000 worms, and the gastro-intestinal tract of a horse from European Russia harbored over 200,000 worms. It is pointed out that the qualitative and quantitative analysis by Skrjabin's method of "helminthological total autopsy" enables one to obtain an unusual variety of helminths at an autopsy of a single animal, to gain an accurate conception of the proportional basis of worm invasion of the animal body and to ascertain the helminth fauna peculiar to a certain region by means of a single autopsy or at the most a few autopsies only. Thus the method has the advantage of economy and rationality in spite of seeming contradictory appearance of expenditure of time and labor involved, in addition to its absolute reliability.

New Requirements of Military Sanitation

Preventive measures are outlined[15] to check the ravages from the employment of pathogenic bacteria by an invading army.

Sanitation of army camps must play a more important role than ever before.

Vaccination of man and animals against all communicable diseases must be made compulsory.

The bacteriologist will become an indispensable advisor to the General Staff.

In certain danger zones, drinking water should be used only after filtration and boiling.

Strict isolation of infected persons and animals must be demanded.

Combative measures against rodent pests must be considered.

[15] Lusztig. Bacterial Warfare. *Berl. Tierärztl. Wchnschr.* 47 (1931):313-319.

Vaccination Against Rabies

In many cases immunity against rabies[16] may be very reliable and may last about a year. However a considerable number of highly immunized experimental animals will not withstand even the first subdural infection shortly after the completion of the immunization.

Therefore in cases of reinfection of vaccinated persons the vaccination must be repeated, taking into consideration, of course, the severity of the lesions and the time passed since the previous vaccination had been performed.

Stomach Worms Fatal to Cattle

A fatal cattle disease of the marshy country along the West coast of Schleswig-Holstein had long been known as "grass disease." A recent investigation disclosed that the disease is caused by invasion with *Ostertagia ostertagi*. The infection of the meadows in the spring is brought about by the cattle which had been stabled during the winter. The question whether larvae hatched in the fall would be able to withstand the winter could not be answered. Feces kept in the dark and at room temperature between 20° and 21° C. will show larvae, on an average, in 9 days. They will migrate toward the glass walls. Attempted treatments had negative results.

Equine Infectious Anemia Causes Tuberculosis Reaction

Seven tuberculosis-free horses, which had swamp fever as proved by the clinical, hematological, serological and later by autopsy findings, were subjected to different tuberculin tests. They reacted with more or less pronounced reactions. The positive reactions could be produced in several cases repeatedly with identical results. The best reactions were obtained with the subcutaneous test. The ophthalmic reaction also gave distinct

[16] Hermann, O. Duration of Vaccination Protection in Lyssa. *Zentralbl. f. Bakt.*, etc. Abt. 1, Orig. 117 (1930):141-145.

[17] Nöller, W. and Schmid, F. Stomach Worms in Cattle in Schleswig-Holstein. *Tierärztl. Rundschau.* 36 (1930):799-802.

[18] Dehner, O. Unspecific T. B. Reaction in Swamp Fever Horses. *Arch. f. Tierheilk.* 63 (1931):23-32.

results. Experiments on a larger scale will possibly answer the question as to how far the tuberculin test can be used as a diagnostic agent for equine infectious anemia.

Spray Poisoning in Animals

The chronic form of cuprism[19] was at times preceded (and prevented) by a fatal acute form with diarrhea. In sheep the symptoms consisted of a crustous eczema of the ear, of peripheral edema, especially of the ears, general icterus and bloody urine. Occasionally, bloody feces were observed. Autopsy revealed pronounced icterus, liver degeneration, hemorrhagic nephritis and hemolysis. At times, hemorrhages into the posterior chamber of the eye were observed. In cattle, the clinical symptoms are less pronounced. Diarrhea is present. Autopsy shows mainly inflammatory changes of the intestinal tract. Icterus, nephritis and liver degeneration are not as pronounced as in sheep. Whether a transitory enteritis seen in horses was also due to cuprism could not be determined. Poultry, however, was seen to die from eating spray-covered plants. The poisoning was confined by chemical examination of 271 sheep, 6 cattle and one calf. The amount of copper found in sheep liver was 32mg per 100gm, and in cattle liver 7mg per 100gm. The first cases occurred four weeks after pasturing the spray-covered grass patches, the last poisoning occurred 8 to 12 weeks after the completion of spraying.

Effect of Injection of Heterologous Spermatozoa

In confirmation of the experiments of other investigators the author[20] found that it is possible to sterilize rabbits by the injection of heterologous spermatozoa. He demonstrated that the parenteral injection of sperms causes the formation of antibodies which are not only specific toward the spermatozoa used in the sterilization, but toward all species of spermatozoa. Thus the spermatozoa form an exception in serologically by exhibiting organ specificity.

Test for Heated Milk

The authors[21] found toluidine practical for the detection of peroxidases in milk, by using the lead-serum of the milk (to 100cc milk add 6cc lead acetate, shake and filter). The following reagents are necessary: (1) a 1% toluidine solution (0.5gm orthotoluidine dissolved in 5cc glacial acetic acid; diluted with distilled water to 50cc), (2) a 1% hydrogen peroxide solution. Immediately before the test mix one part of a fresh (not older than one week) solution "1" with five parts of solution "2".

Method of testing: add 0.5cc of the mixed reagents to 5cc milk serum and shake. A color change is interpreted as follows:

Dark blue color = raw milk.
Light bluish green = milk heated ½ hour to 63-65 C. (145°-149° F.).
Weak greenish blue = milk heated ½ hour to 70 C. (158° F.).
No color = milk heated ½ minute to 83-85 C. (181°-185° F.).

Causes of Blood Coagulation

Starting from the observation that changes in optical dispersion occur during the change from fibrinogen to fibrin, causing changes in the Tyndall effect, Klinke[22] measured the changes with a nephelometer. The results were plotted out, forming a curve. By calculation it was found that the curve indicates a fermentative reaction which becomes accelerated by the product of reaction. Two processes overlie each other during the coagulation of fibrinogen: one taking a slow course, possibly the reaction between thrombin and fibrinogen, and the other a quick acting one, caused by the product of reaction, fibrin. This second phase is presumably an adsorption. Other proofs of the fermentative character of blood coagulation are given.

[19] Schaper and Lütje. Copper Poisoning of Sheep and Cattle Following Spraying of Fruit Trees with Copper Sulfate Solutions. *Berl. Tierärztl. Wchnschr.* 47 (1931) :36-39; 49-54.

[20] Ardelt, F. Production of Temporary Sterility in Female Rabbits by Means of Sperma Toxins. *Arch. f. Gynaekol.* 145 (1931) :474-494.

[21] Ilzhofer, H. Test for Heated Milk. *Archiv. f. Hygiene u. Bakt.* 105 (1931) :319-321.

[22] Kinke, K. New Investigations Concerning the Second Phase of Blood Coagulation. *Klin. Wchnschr.* 10 (1931) :869-871.

New Parasite of the Cat

During the 74th helminthological expedition of the U. S. S. R. a new trematode of the domestic cat[23] was discovered. It belonged to the genus *Pharyngostomum*, but differed from the species *cordatum* by its size. The length is 2.3mm, the maximal width is 1.4mm. The diameter of the oral sucker measures 0.154mm, of the ventral sucker 0.19mm, a considerable difference. The pharynx measures 0.25 × 0.2mm. The branches of the alimentary canal are much shorter and do not extend beyond the anterior border of the ventral sucker.

Physiological Factors Affecting Calcium Content of Blood

The concentrations of the electrolytes of blood are closely related to the internal secretion and to the vegetative nervous system. On the basis of this knowledge and in continuation of the authors[24] earlier investigations into the sexual physiology and pathology of domestic animals; the variations of the serum calcium level in connection with the functions of the sexual organs, especially with the physiological periodicity of the ovary, were examined.

Age has a distinct influence upon the calcium content. Calves have more serum-Ca than full grown cattle. Males average 11.45mg per 100cc of blood, and female calves 11.64mg.

The highest average in cows is 10.23mg per 100cc during esterus; during interestrus it is 10.17mg per 100cc. In one cow the values were traced through two heat periods. It was found that from the day before estrus up to complete ovulation, there was a marked increase of the calcium (1.2 to 1.6mg per 100cc of blood); then followed a decrease of 0.9 to 1.7mg for two days. The following, not so pronounced, increase, according to the assumption of the authors, is related with the development of the yellow body.

With increasing age, cows show a decided decrease of the serum-Ca content. During gestation the calcium level of the serum is decreased.

Castration seems to lower the calcium values; spaying increases them. In cases of cystic degeneration which is frequently accompanied by nymphomania, calcium is increased. The calcium content of the cystic fluid is somewhat higher than that of the blood.

Injection of progynon into a cow was followed by a lowering of the calcium level for several hours, while injection of sistomensin and anterior lobe extract of the hypophysis produced an increase for a short time.

Diagnosis of Pregnancy in the Mare

The author[25] found the vaginal examination of practical value 16 days after conception. For earlier diagnosis, beginning six days after coitus, the microscopical examination of the vaginal mucus gives dependable results. It allows for the following discrimination:

The mare is non-gravid, when the cell elements consist of neutrophile leucocytes only (it is exceptional that very few cell elements are present at all), when even after two weeks very few cell elements are present, when relatively few cell particles are present and when the neutrophile leucocytes are karyolytically degenerated while the ciliated epithelial cells and leucocytes are present in equal number and even distribution, when the mucus takes a faint homogenous Giemsa stain (sometimes cloudy products of degeneration occur) and when the leucocytes are always markedly swollen and form an irregular mass.

The mare is gravid, when the cellular elements consist of ciliated epithelium only or when they considerably outnumber the leucocytes (it is exceptional that very few cell elements are present at all), when relatively more ciliated epithelial cells are present than leucocytes, even if both cell elements are present in equal number and even

[23] Skrjabin, K. J. and Popow, N. P. *Pharyngostomum Fausti n. sp. Tierärztl. Rundschau.* 36 (1930):709-710. 2 fig.

[24] Frei, W. and Emmerson, M. A. The Serum Calcium Level of Cattle with Special Consideration to the Relation of the Sexual Apparatus. *Biochem. Zeitschr.* 226 (1930):355-380. Abstr. *Berl. Tierärztl. Wchnschr.* 47 (1931):443.

[25] Kurosawa, R. The Early Diagnosis of Gestation in the Mare by Means of Vaginal Examination, Especially the Examination of the Vaginal Mucus. *Tierärztl. Rundschau.* 37 (1931):345-349 and 361-365.

distribution (in this case all cell nuclei stain pycnoticly with hematoxylin), when mucus spheres can be found in the mucus.

The latter finding and the predominance of mucus masses which stain deeply with Giemsa stain are very characteristic for pregnancy. The number of mares used was 124, of which 81 were pregnant and 43 were non-pregnant. Correct diagnoses could be made between six and ten days in 86.4% of 22 cases with the microscopical examination; after 11-15 days in 90.5% of 42 cases with the microscopical method, and in 42.9% with the vaginal method; after 16-20 days in 100% of 22 cases with the microscopical method, and in 81.8% with the vaginal method. The examination by the two methods combined gave 93.7% correct diagnoses in 64 cases after 11-20 days. After 21-30 days the microscopical examination gave 100% correct diagnoses in 38 cases, while the vaginal method gave 94.7% correct diagnoses.

Turpentine Injections for Mastitis

The treatment[26] consists of subcutaneous injection posterior to the scapula of 8cc of turpentine, frequent milking of the affected quarter, destroying the milk and clean bedding. With the exception of a slight defuse swelling, no damage to the tissues is produced.

Two of the 16 case reports follow:

No. 1. July 16, Mastitis right fore-quarter. Infection, streptococci.

Gave 8cc turpentine, July 17th. Result: Cured July 21, 1930.

No. 2. September 3, Mastitis in right fore-quarter. Two days standing, almost no milk. Infection, staphlococci.

Gave turpentine as in No. 1, September 3. Result: September 9 the infected quarter still swollen and with abnormal content, but the milk flow had increased to 15 liters. September 27 gave 23 liters of milk and was completely cured.

[26] Vedel, P.; Turpentine Treatment for Mastitis; *Svensk Veterinartidskrift*, 36 (1931): 21-25, No. 1. Abstracted by O. Norling-Christensen, '32, O. S. U., Columbus, Ohio.

A Study of the Trichuroidea

In the course of certain examinations of nematodes Müller[27] investigated in the *Trichuroidea*, especially in *Trichiuris leporis* and *Tr. ovis* the role of the alimentary tract in relation to nutrition and also the purpose of the whip-like anterior body. He found the esophagus to be a capillary tube with a maximum width of 20 microns, but usually narrower. This narrowness and the uncommon length of 20mm, in the absence of contractile elements in the walls and the impossibility of the esophageal fibers exerting traction, due to the resistance of the cell body, led Müller to the conclusion that the esophagus is not used for the purpose of nutrition, except as an excretory organ.

He found that the anterior body is surrounded by a sheath, resulting from the excretory products of the glandular field. The sheath is made adherent to the intestinal wall by means of confluent drops of secretion, originating near the anterior end of the glandular field. These wart-like connections serve the purpose of osmotic nutrition, they dissolve tissue cells of the host. The substance resulting from this destruction is assimilated by these wart-like structures. The osmosis is facilitated by a contractile play between the dermis and the cell body, creating suction upon the surrounding fluid and aiding its osmotic entrance into the cell body. It is pointed out that the trichina exhibits close relation in its alimentation and capsule formation to the genus Trichuris.

Chitwood[28] considers the function attributed by Müller to the cell body as still doubtful. With regard to the trichinae, Chitwood is of the opinion that the esophagus of *Trichinella spiralis* is capable of functioning, although he ascribes to the massive cell body the function either of absorption or of storage of food. In *Trichuris ovis* and *Tr. vulpis* the anterior part of the esophagus, in front of the cell body, is similar to that of *Trichinella spiralis*, as observed by Müller. The esophagus is deeply imbedded in the cell body, and the shape varies frequently.

[27] Müller, G. W. Nutrition of Certain Trichuroidea. *Zeitschr. f. Morphol. u. Oekol. d. Tiere* 15 (1929):192-212.

[28] Chitwood, B. G. The Structure of the Esophagus in the Trichuroidea. *Jour. Parasitol.* 17 (1930):35-42.

Avian Tuberculosis in a Deer

Tuberculosis of wild animals has always been considered rare except in animals that have been confined or been in contact with civilization. Especially avian tuberculosis was formerly thought to be of negligible importance to mammals. An interesting case was studied by Prof. M. Christiansen,[28] Copenhagen, Denmark.

A deer was accidentally killed by an automobile and the liver and spleen were given to the State Laboratory for examination for diagnosis. The left third of the liver was completely filled with nodules of the size of hazel nut to that of hen eggs. The nodules were so close together that the parenchymatous cells in this part of the organ were completely gone. The nodules showed marked fluctuation, were roundish but partly of irregular shape. Each nodule was surrounded by a rather heavy connective tissue capsule and inside this was a soft cheesy mass, which could easily be separated from the capsule and which contained numerous small granules of calcium. Cutting through the nodules, a uniform surface with concentric layers of calcium grains presented itself. Spread in the other part of the liver were some bean to hazel nut sized nodules and dorsal over in the right side a nodule of the size of a hen egg, all of the same structure.

The portal lymph gland was gone except for a little part there was calcified. In the spleen there were a number of pea to walnut sized round nodules of the same structure as the one found in the liver. Almost the entire surface of the spleen was adherent to a round fluctuated process. This was bigger than a goose egg and connected with the diaphragm.

The bacilli were typed and proved to be of the avian strain of the tubercle bacillus. This deer had been seen for several years previously in the vicinity of poultry farms on which tuberculosis was known to exist.

[28] Christiansen, M.; Generalized Organtuberculosis in Deer Caused by Avian Tuberculosis; *Maanedsskrift for Dyrlaeger*, Vol. 43 (1931) No. 8 (81-87). Abstracted by O. Norling-Christensen, '32, O. S. U., Columbus, Ohio.

A Study of Bovine Coccidiosis

A review of the literature shows that bovine coccidiosis is widely spread, occurring in dry and moist climates and during warm and cold seasons of the year. The author's[29] observations indicate this protozoan is present in the intestinal tract of many apparently normal cattle in widely separated sections of the country, but they become numerous enough to produce serious disturbances only occasionally. In some areas the disease causes serious annual losses in calves.

Eimeria zurnii is the species most common, although *E. smithi* and *E. cylindrica*, Nov. Sp. are usually present. The latter species is described and the name suggested.

What little research work has been done with this disease has for the most part been fragmentary and many contradictory statements have been made. The author finds the oocysts of the species of the genus Eimeria affecting cattle highly host-specific, that they are killed by 10 minutes exposure at 55° C. (131° F.) by prolonged freezing, direct sunlight, prolonged drying, putrefaction, 0.3% murcuric chloride, 5% phenol, 4% formalin, and 2% liquor cresolis comp. They may be successfully incubated in 2% $CuSO_4$, or 2% $K_2Cr_2O_7$, and are not injured by centrifuging. The author was unsuccessful in digesting the oocyst wall in vitro or in young rats. The prepatent period is about 7 da., which is followed by a period of about 30 da. when the oocysts are eliminated in great numbers, ending in the animals becoming immune or resistant, or it may become a chronic carrier, if death does not occur. The author believes that recovery from the disease may be due to immunity rather to a limited number of asexual generations as has been suggested for some species. The symptoms are bloody diarrhea, followed by emaciation and weakness. The appetite remains fair and there is no rise of temperature. Autopsy findings are principally enteritis ranging from catarrhal to hemorrhagic, and in severe cases, sloughing of the intestinal epithelium.

[29] Wilson, Irl Donaker. A Study of Bovine Coccidiosis. Va. Agr. Exp. Sta. Tech. Bul. *No. 42*, 44 pg. *7 pl.* 1931.

BOOK REVIEW

A Textbook of the Diseases of the Small Domestic Animals. By Oscar Victor Brumley, V.S., Dean of the College of Veterinary Medicine and Professor of Veterinary Medicine, The Ohio State University. Second Edition, Thoroughly Revised. Lea & Febiger, Philadelphia, 1931. Price $4.75.

The author states in the preface, this book is intended to be a practical text of the diseases of the small domestic animals. He considered it inadvisable to deal exhaustively with the subject, as the present work is intended primarily for student use and for the busy practitioner. In pursuance of this goal, the diseases of fowls have been eliminated from this edition, on the theory that a separate text on poultry diseases is more in keeping with a logcial division of the study of the diseases of small domestic animals.

In preparing this second edition, Dean Brumley has availed himself of the help of his associates. The subject matter relating to parasites and parasitic conditions has been checked or rewritten by Russell E. Rebrassier, Chairman of the Division of Veterinary Parasitology, Ohio State University. Other chapters on diseases have been rewritten or added to by Walter R. Hobbs, Associate Professor of Veterinary Medicine and Secretary of the College of Veterinary Medicine, Ohio State University. The authors have condensed a considerable amount of literature and enriched it with the results of their vast practical experience in this field.

In its present form the book offers an excellent presentation of the subject and does credit to the high standard of American Veterinary teaching. Dean Brumley's long experience as a teacher of clinical veterinary medicine, his years of association with the problems of the treatment of small domestic animals and his profound scientific interest in these problems made him peculiarly fitted to write this book. The evident thoroughness with which this second edition has been assembled and the professional standing of the author and his coworkers give assurance that the work is practical and that the discussion is brought down to date.

A discussion of all the important medical and surgical diseases of small animals with which the veterinarian will come in contact is included. It can be truthfully said that no other work has such an accumulation of ready information on the subject under discussion. The text is written in a clear, interesting and readable style. The subject matter is arranged in an orderly fashion and is divided into fourteen sections: Diseases of the respiratory system, diseases of the circulatory system, diseases of the digestive tract, diseases of the reproductive organs, diseases of the blood and blood producing organs, diseases of metabolism, diseases of the organs of locomotion, diseases of the urinary system, diseases of the nervous system, diseases of the skin, diseases of the ear, diseases of the eye, hernia, infectious diseases. The chapters under these divisions cover the subjects adequately and are well balanced.

All in all, the aim of the author has been admirably attained. The student will find authoritative information and the experienced practitioner will discover much stimulating food for thought as the chapters are replete with valuable suggestions. The book is carefully indexed and the typography is excellent. The new edition will retain the place held by the first edition as the leading reference work on diseases of small domestic animals. Every student of veterinary medicine and that of course includes every worth-while practitioner doing small animal practice, should acquaint himself with it. Fritz Volkmar.

Dogs, How to Select, Train, Feed and Care for Dogs. By John S. Stuart. Published by the Delineator Institute, Butterick Bldg., New York. Price 25 cents.

This booklet contains excellent illustrations of the breeds and lists breed standards with suggestions on the selection of a dog for the home. It also contains some sensible suggestions on the care of dogs and a mediocre discussion of disorders, the best part of which is the prediction that owners will "find it far cheaper, safer, and more expeditious to consult a veterinary in the first instance rather than to purchase expensive and unknown drugs for unknown conditions, for administration by an unpractised hand."